Popular Mechanics Magazine

REGISTERED IN U. S. PATENT OFFICE

WRITTEN SO YOU CAN UNDERSTAND IT

Vol. 29 JANUARY, 1918 No. 1

German Peasant Women Do Work of Horses

WHAT American women may expect if Prussian Kultur is not stamped from the face of the earth is gathered from the observations of an American bicycle tourist who left Germany shortly after the outbreak of the war. The spectacle of women doing all manner of heavy labor was never particularly unusual in Germany even in pre-war days, but the sight of four women harnessed like horses and pulling a plow was a distinct shock to the traveler who witnessed this scene along the road-side in the state of Hesse-Nassau. In an adjoining field women with scythes and cradles were harvesting a bumper crop of wheat.

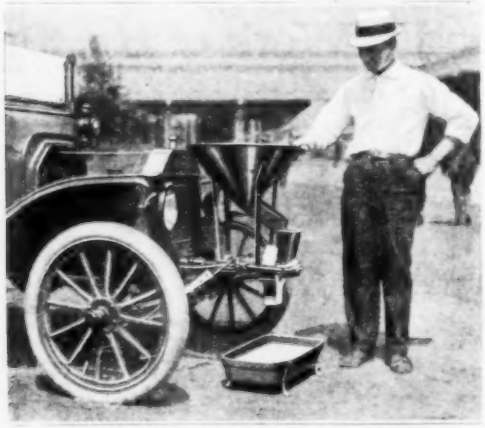
The tourist stopped that night at a near-by inn and there, in conversation with a number of German peasants, expressed surprise that women should be driven to such drudgery. The peasants were much astonished when informed that women in America seldom work at any task heavier than household duties or light factory or office toil. The men broke into laughter and in utter amazement declared that with nothing but the housework and the care of the children, they could not imagine how the American women would occupy the vast bulk of their time.

After Toiling in the Fields All Day These German Peasant Women Go Home to Do the Housework and Other Duties That Ordinarily Constitute a Day's Work for the Average American Housewife

As the inevitable outcome of this type of Prussianism, the average German housewife is a broken-down old woman at the age of forty-five.

FEED GRINDER ATTACHES TO AUTO CRANKSHAFT

A recent addition to the apparently endless list of uses, to which an automobile engine of a familiar type can be put, is preparing feed by means of a new grinder that attaches to the crankshaft. The machine can be installed in a few minutes and does not require that the car be kept stationary. Its capacity, according to reports, is 30 bu. of oats per hour.



A Feed Grinder That Gives an Automobile Engine New Utility: Its Capacity is Said to Be 30 Bushels of Oats per Hour

NEW SPECTACLE LENS IS MULTIFOCAL

An improvement in spectacle lenses designed for near and far-focus has recently been perfected, which eliminates the "blind zone"—a term used to designate that blurred portion of the field of vision lying between the area made clear by the long focus and the area made clear by the short focus. The improvement is effected by grinding the glass according to a new method and in such a manner that the short focus gradually merges into the long focus, making the lens, in fact, multifocal.

NORWAY MEETING CRISIS WITH CONCRETE SHIPS

IN view of the surprising progress that is being made in Norway, it appears that we are entering the era of reinforced-concrete shipbuilding. The maiden voyage of a boat of that construction, the 500-ton freighter "Namsenfjord," recently demonstrated to the satisfaction of its owners the practicability of such material for big vessels. Propelled by an oil-burning Diesel engine at a speed of about 11½ miles an hour, the ship made the trip from Christiania to a British port and return without incident.

The "Namsenfjord," the launching of which was announced some time ago, is the first of a considerable number of similar craft, designed for merchant service, to put to sea. Of some 15 vessels already built, it is the largest. But of a group now in the process of erection it is the smallest.

According to what is considered authentic information, the Moss shipyard has under construction one vessel of 4,000 tons, three of 1,600 tons, and one of 1,000 tons, all designed to mount oil-burning engines. In addition, a government lightship, for service off the coast, a tugboat, and two floating docks, each capable of accommodating ships of about 7,000 tons, are under way.

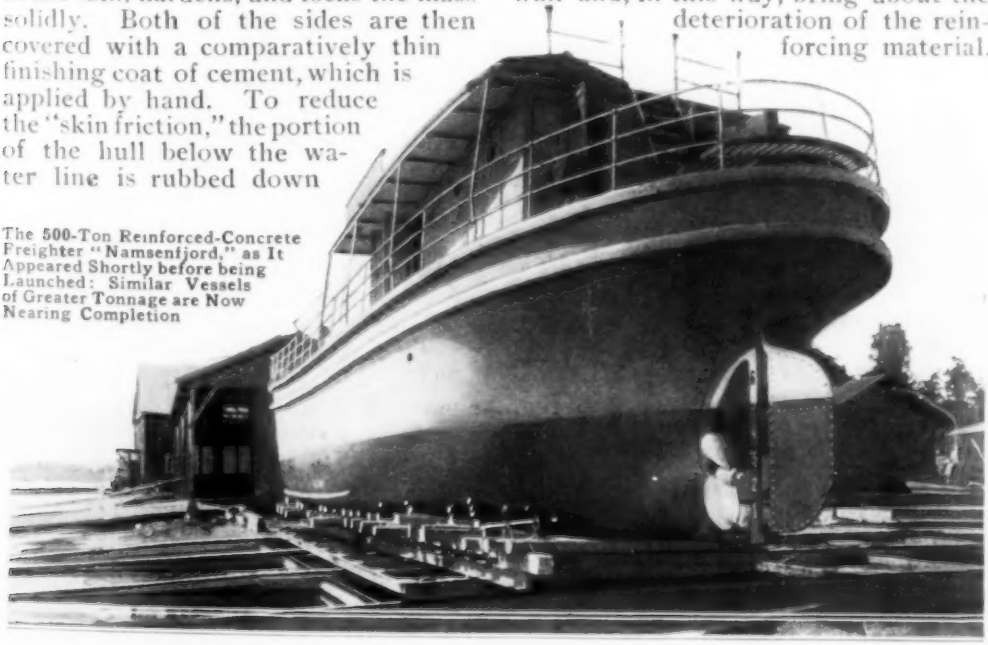
All the concrete ships so far built, and those in the course of construction, are of a structural pattern devised by an engineer who returned to Norway at the time the country was facing a desperate situation because of the dearth of bottoms. He had been engaged in building large reinforced-concrete barges in the Philippines and immediately began the promotion of a concrete-ship plan. The idea met with sufficient favor to make possible the establishment at Moss, not far from Christiania, of shipyards capable of producing from 20,000 to 30,000 tons of shipping a year.

The particularly interesting feature of the construction system is the eco-

nomical use of steel, as exemplified in the "Namsenfjord." Below the water line the hull has a thickness of about four inches. Above, however, it tapers until at the top it is only 2½ in. thick. This is possible because thin bars and metal lath form the framework. Two thicknesses of the latter are placed parallel, a couple of inches apart. Into the space thus provided the concrete mixture is poured. Some of it presses through the perforations in the lath, hardens, and locks the mass solidly. Both of the sides are then covered with a comparatively thin finishing coat of cement, which is applied by hand. To reduce the "skin friction," the portion of the hull below the water line is rubbed down until it is almost as smooth as the bottom of a steel ship.

The "Namsenfjord" Under Way off the Coast of Norway during the Trials: Since the Picture was Taken the Ship has Journeyed to England from Christiania and Returned

Waterproofing, of course, is what makes the concrete vessel possible for shipping purposes. The material employed to meet this problem impregnates the water that is used in mixing the concrete. When the latter dries out, the proofing substance remains in the pores. Upon subsequently encountering water, it swells, filling the interstices so that moisture cannot penetrate the wall and, in this way, bring about the deterioration of the reinforcing material.



The 500-Ton Reinforced-Concrete Freighter "Namsenfjord," as It Appeared Shortly before being Launched: Similar Vessels of Greater Tonnage are Now Nearing Completion

WHEN AMERICA CAME IN

Bulgars Refuse to Fight Sammies—Heart-Rending Stories of Returned Emigrants

Triumphal Journey through the Balkans and Greece Made by Popular Mechanics Representative Following Declaration of War by the United States

By LEWIS R. FREEMAN

IF the kaiser of Germany was as surprised at America's entry into the war as was his royal brother-in-law, King Constantine of Greece, there must indeed have been consternation in Potsdam last April. Constantine, whom on the evening of my arrival in Athens I had seen driving through the streets and acknowledging the greetings of his misguided people with the jauntiest of salutes and the gayest of smiles, was one of the most dejected figures imaginable on the glad occasion of the royal Te Deum in the cathedral on Greek independence day, April 7. His abnormally protuberant forehead was wrinkled in a sullen scowl throughout the whole imposingly beautiful ceremony.

America's entry came at a time when the royalists were still blithely pursuing their local adaptation of "daily hate" by heaping a cairn of filth-fouled rocks in a public park of Athens as a symbol of the "eternal execration" in which the name of Venizelos was held by all "true Greek patriots." Partisans of the late prime minister were going about in fear of their very lives, and the only individual I came across who dared to give any outward expression of the renewed hope stirring inwardly as a consequence of the action of the United States was a man in an obscure street who had lashed the Stars and Stripes to the top of his barber's pole. Most of the passers-by doubtless thought that the two red, white and blue insignia were intimately related to each other, and it was probably lucky for the doughty barber that he displayed the Stars and Stripes somewhat "camouflaged." But when I pushed inside to ask him if it was a coincidence that the wrinkled bit of bunting was out on the same day that America's entry into the war arrived, he made no effort at concealment.

"Bet yer life it ain't by chance," he said stoutly. "I cut hair on the ol' Bow'ry for sev'n years 'fore I beat it back to this d—d hole. Nope, ain't a 'Merican cit'zen; but yu take it frum me I'm goin' tu be if they don't fire this hull big bunch o' cutthroats—king an' all—out o' Greece on the doubl'. I bro't that flag all the way frum lil' ol' Nuyork with me. Today the first time I gets up the nerve tu put it out; but now it *is* out, by —, it'll stay ther' till they cum an' shoot it down. An' maybe they'll start more'n they're lookin' fer if they duz that."

One meets many returned emigrants from America in all parts of Greece—as everywhere else in the Balkans—and it is an interesting fact that everyone of those whom I encountered at this crucial epoch in Hellenic history was a most stanch Venizelist and intensely bitter against Constantine and the whole royalist regime. A family who gave me shelter for a couple of days in a little village on the slopes of Mt. Olympus in the course of my precarious journey by land from Old Greece to Saloniki furnished a fair example of the discriminating attitude adopted by even the most ignorant of these as a consequence of their "spell of freedom" across the water. Five brothers of this patriarchal establishment had spent from four to eight years apiece working in the mines and smelters of the western states, and all of them had eventually returned to invest their "fortunes" in sheep and goats and to become "leading citizens" of the cliff-begirt little Olympian village of Litochori.

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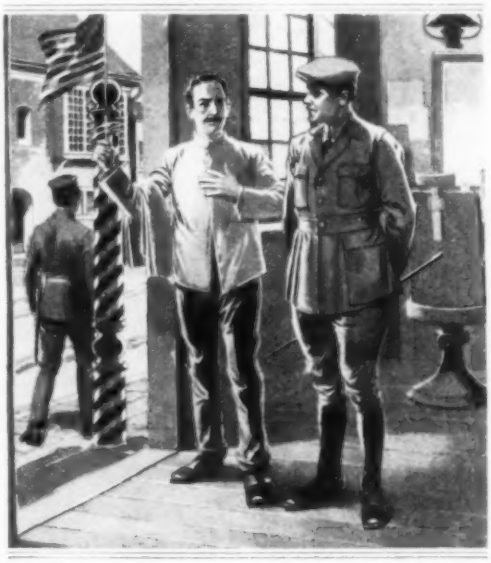
The eldest brother had erected a little café and rest house, at the temporary terminus of the line where the rails had been cut, and this he had named "Hotel Tacoma," in honor of a more pretentious hostelry in the last town he had worked at in Washington. He celebrated the arrival of the first "reel 'Mer'can" the village had ever known by "shouting the house" in true western mining-camp fashion. After everyone—shepherds, fishermen, section hands, the station agent, and two soldiers in royalist uniform—had been provided with a glass of *mastic*, he proposed the toast to "Pretty soon 'Merica come fight for Greece." Then I stood a round to "Pretty soon come back Venizelos," which a second one of the returned brothers followed with "T'ell wi' Constantino!" The last toast was so popular that it would undoubtedly have been drunk repeatedly had not the end of the *mastic* put a period to the international amenities.



"I bro't that flag all the way frum lil' ol' Nuyork with me. Today the first time I gets up nerve tu put it out; but now it is out—it'll stay ther' till they cum an' shoot it down."

Grimly tragic was another occasion on which I heard a returned Greco-American curse his traitor king with what must have been not many removed from his dying breath. It was toward the middle of last June that I entered Janina on the heels of the Italian army, to find the people of that loveliest of all Epirotic cities in the last stages of starvation. The rich valleys above and below the town had produced food enough to feed its 20,000 inhabitants four or five times over, but the royalists, in provisioning Athens against the punitive blockade of the allies, had transported to the capital all the grain they could lay hands on. The inevitable sequel was one of the saddest of the war, and I must confess that I have been scarcely more stirred by the streams of wounded draining back from Verdun and the Somme than by the sight of the ghastly dead and dying—men, women, and children—lying indiscriminately on the sun-hot cobbles of the streets of Janina and in the shade of its incomparable plane trees.

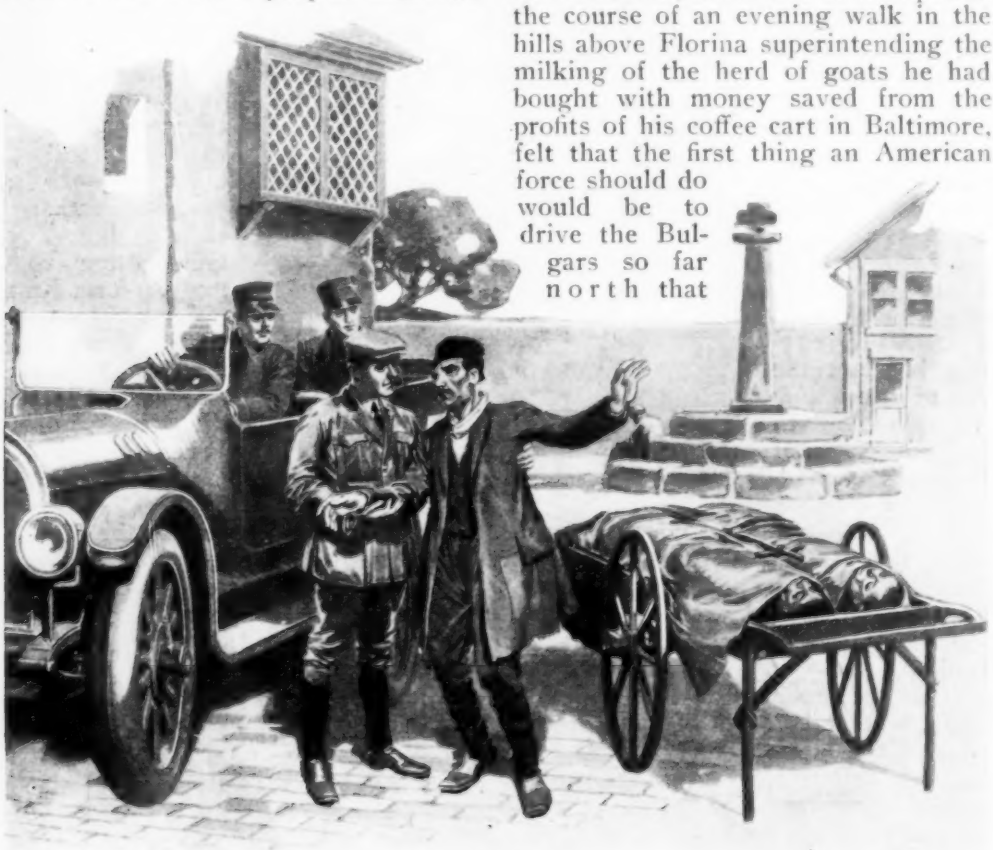
It was just at the edge of the public square that my car was brought up sharp to avoid running over a poor fellow who had collapsed in a heap while trying to wheel out of the way a push barrow on which were stretched the emaciated corpses of a man and woman. He dragged himself to his knees by clawing up the smoking radiator of the big Fiat and—noting that my uniform was different from that of the Italian officer at my side—asked if I spoke English. When I jumped out, lifted him to his feet, and told him that I was an American, he almost choked with excitement.

"I was contractor — Cheyenne, Wyoming—f'r ten years," he gasped brokenly. "My broth'r there"—jerking his head toward the body of the man on the barrow—"was with me. Made plenty money. Came back here an' bought big farm. We—rich men here—plenty cow an' sheep—much land—all we want. This year good crop—fine prospect. Then Constantino send soldier—take all—cow, sheep, goat, corn—not pay nothing. Three months just little corn an' roots to eat. My

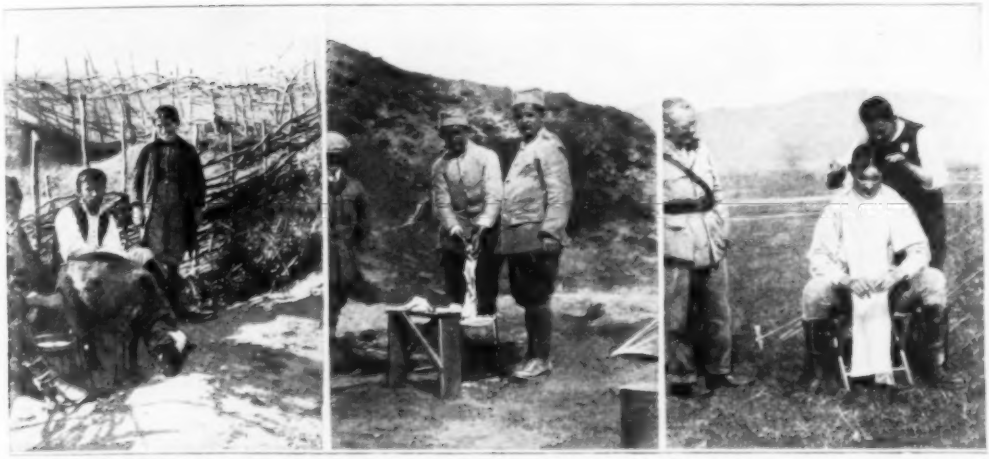
mother die—then my wife—then my boy and girl. Yest'day 'Talian come—bring plenty bread, plenty rice. But we eat too much. Stomach no good. Last night my brother an' his wife—both die. I very sick—very weak. You tell 'Mericans—we—I—Oh, G—d d—m Cons'tino—"

He slid down into a limp heap at my feet. We put him in the car and carried him to the little hospital the Italians had reopened in Ali Pasha's old fort, where, though we managed to get him attention ahead of the hundred or more similar cases that were waiting, they told us he was so far gone that there was little hope of pulling him through.

Nothing could have thrown a better light on the circumscribed political outlook of the Balkan peoples than the fact that not only the inhabitants of the primitive villages, but also many of those who had spent a number of years in America or England, invariably seemed to take it for granted that the entry of the United States into the war would immediately be followed by the dispatch of troops to help attain whatever happened to loom in the mind of this or that individual as the most necessary end. An Albanian I encountered in Koriza, who had earned enough driving an express wagon in Brooklyn to return and set up a knick-knack shop in his native town, was convinced an American army should be landed at Avlona for the purpose of pushing the Austrians out of all of Albania and setting up a national government at Scutari. Similarly, a Macedonian Vlach, whom I chanced upon in the course of an evening walk in the hills above Florina superintending the milking of the herd of goats he had bought with money saved from the profits of his coffee cart in Baltimore, felt that the first thing an American force should do would be to drive the Bulgars so far north that



"When I jumped out, lifted him to his feet, and told him that I was an American, he almost choked with excitement. 'I was contractor—Cheyenne, Wyoming—f'r ten years,' he gasped brokenly."



"A Macedonian Vlach . . . felt that the first duty of an American force should be to drive the Bulgar so far north that his town would have no more air raids."

"A Serb who did my washing at Scochivir had no doubt that the American army should fight its way north from the Crna bend."

"While the one that cut my hair at Baniza was equally certain the Yankee advance had best be made up the Vardar."

there could not be a repetition of such air raids as the one which wrecked his house and killed his best dog the previous week. A Serb who did my washing at Scochivir had no doubt that the American Balkan army would fight its way north from the Crna bend, while one that cut my hair at Baniza was equally certain the Yankee advance had best be made up the Vardar. The reason for the "strategy" of each I understood when I discovered that the home of the first had been in Prilip and that of the second in Gievgili.

If the truth were known I think it might well transpire that, of all the Balkan peoples, the Bulgar was the one most impressed by the entry of America into the war. Of all Bulgarian overseas emigrants ten went to the United States to one to any other country, and in the exaggerated imaginations of these men and their friends, America constituted just about all there was of importance in the whole outside world. The actual significance of President Wilson's action could not possibly have spread very rapidly in Bulgaria, and yet even by the middle of May there had been a noticeable increase in the number of Bulgars deserting to the British armies on the Struma and Vardar, an increase which the intelligence officers had no difficulty in tracing directly to the entrance of America. "It is a remarkable fact," a British officer engaged in interrogating prisoners said to me, "that of recent Bulgar deserters fully 15 per cent have been in the United States at one time or another, and their number is on the increase. These men ignore completely the technical fact that their country is not at war with the United States, and say simply that they do not want to fight against America and that they laid down their arms just as soon as they had a chance."

The French, Serbs, and Italians were also reporting increased Bulgar desertions at this time, and it was at a prison camp of the latter near the Crna that I had the opportunity to talk with a genial cobbler who had once worked in Fall River, and who, with his shoemaking tools under his arm, had sauntered over from the Bulgar lines the week before. He had come home, he said, to fight Serbs, not Englishmen, Frenchmen, and Italians. He had been trying to screw up his nerve to desert for some time, but hadn't got it to the sticking point until a friend—another returned Americansky—had picked up a paper dropped from an aeroplane saying that America had joined the allies. Shortly afterward, taking advantage of the confusion following the sniping of an officer, he slipped out of a sap and over to the wire in front of the

Italian trenches without being missed. He was in hopes, he said, of being turned over to the "American army," and being sent to a prison camp in the United States, adding naïvely that, while the Italians were very kind to their prisoners, he did not feel it was right to keep them where they were so exposed to air raids.

"What air raids?" I asked. "Bulgar," he replied, adding that only two nights before bombs intended for the "dump" and hospital had struck right in the midst of the prison camp, and that if he hadn't been in the big dugout he would have been killed.

In all Saloniki at the time of my visit there were only three American flags, one belonging to the consulate, one to the Standard Oil Company, and one to a mission school about five miles out in the country. Naturally, the starry trio were in great demand for all international functions where it was desirable that honor should be done to all of the allies, and there was usually a considerable waiting list for each of them. Still more in demand was the lone copy of the music of the "Star Spangled Banner," which they never did, I believe, succeed in expanding sufficiently to make it go all the way round a full band. "America," to the air of "God Save the King," was the commonest substitute; but I also heard "Yankee Doodle," "Dixie," and once—by the Serbian band, on an especially formal occasion—"My Home in Tennessee."

The Jewish tailors in Saloniki began turning out some very fearful and wonderful substitutes for the Stars and Stripes before long, the cheapest of these being made by painting red the light blue stripes of the old Greek flag and stitching a starry rectangle—likely to be of any color—in one (and not necessarily any particular) corner. As an "improvisation," however, I am confident that no American flag since the first patchwork original has been worthy of mention in the same breath with the amazing banner which was thrown to the breeze of Mt. Athos on the occasion of my visit to one of the monasteries of this strange medieval community.

"I had the opportunity to talk with a genial cobbler who had once worked in Fall River, and who, with his shoemaking tools under his arm, had sauntered over from the Bulgar lines the week before."

Mt. Athos is the third of the three fingerlike peninsulas jutting out from the mainland to the south of Saloniki, and for nearly 2,000 years—even through the Turkish regime—it has been kept sacred to monasteries of the Greek church, which have maintained there a sort of "hierarchal republic," with an elective parliament. It is unique in that not only is the distracting presence of no woman allowed in the whole extensive area, but also in that the female of every species of animal—dog, cat, cattle, horse, and even chickens—is rigorously excluded. The monasteries—all of them are fabulously rich—were suspected of being centers of political intrigue early in the war, but since the appearance of the allies at Saloniki have given continued evidence of loyalty to the entente cause. An especial point has been made of the elaborate and formal entertainment of allied visitors, and as the first American to go to Mt. Athos after the entry of the United States into the war, the kindly

but simple monks saw no absurdity in arranging another of just the same sort of "triumphal tours" with which they had been welcoming French and British admirals and generals. This included a service in my honor in the ancient church of one of the Russian monasteries, a reception by the house of parliament, and a series of formal banquets in various parts of the peninsula. There were allied flags in abundance displayed on all occasions, but it was not until the concluding feast at the rich and beautiful monastery of Lavra that the resourcefulness of the monks succeeded in supplying the much-lamented lack of an American flag. The banner which greeted me at the little spray-wet quay and was carried at the head of the procession up the winding road to the monastery gate was a most imposing one, and I was especially struck with the bas-relief effect of the three or four snowy stars which peeped out between its ample folds. There was only one fault to find with it—it would persist in drooping and only wriggling snakily in the breeze that was coming up from Gallipoli-way at a rate to set the other flags in the procession whipping to tatters. Why this was I did not understand until after it had been brought up to the banquet hall and spread proudly out—with a monk at each corner—for my inspection. Then it transpired that the red stripes had been stained with raspberry jam, the cerulean background of the stars with gooseberry jam, while the stars themselves were nothing more or less than starfish which had been gathered at low tide, baked stiff in an oven, and whitewashed!

How the Popular Mechanics Representative was Received by the Monks of Mt. Athos: The American Flag was Specially Made for the Occasion. The Stripes and Field were Stained with Jam, While Starfish, Baked and Whitewashed, Formed the Stars. Mr. Freeman is Standing on the Second Step from the Bottom

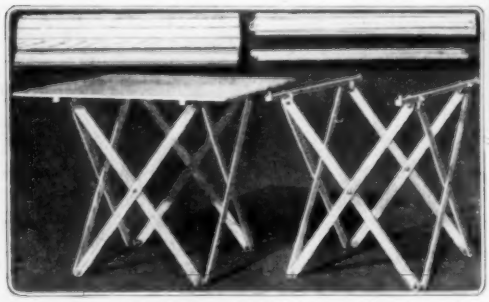
Not unnaturally, the various political and military leaders in the Balkans were inclined to view the entry of America according to the way in which it was calculated to affect the ends for which they were striving. Venizelos told me that it was the one event more potent than the Russian revolution in helping him to save Greece from herself and her traitor king, while Crown Prince Alexander said he was sure that now the restoration of Serbia would not be long delayed. General Missich, the brilliant chief of the Serbian first

All of the Serbian Relief Camps Maintained by the American Red Cross Had Special Celebrations in Honor of the Coming In of the United States. This Photograph was Taken at a Refuge in an Old Turkish Harem at Vodena, on the Occasion of the Visit of Dr. Ryan (in Center), Director of the American Red Cross in the Balkans

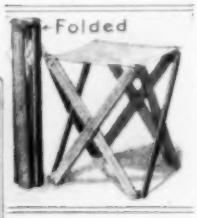
army, was deeply interested as to how many new recruits might come to him from America from among Serb emigrants there, and similar considerations, together with the possibility of financial help for their country from the United States, appeared to engross the two or three Italian leaders I met at this time. General Sarrail I found pondering the possibilities of America furnishing help in men or matériel that might affect the military situation in the Balkans. Generally speaking, I found the Latins much more prone to clink glasses and drink sounding toasts to America's entry than were the British; but withal I carried away the feeling that the latter, with fewer selfish interests to be served than the least of the others, were yet the ones who took the historic event most deeply to heart.

CAMPING TABLE AND CHAIR ARE EASILY CARRIED

Folding furniture that has rigidity and strength when assembled, and compactness when prepared for transportation, meets the needs of a large class of campers. A table and chair that come within these specifications are made of canvas and light wooden slats. The former article is supplied with a top, 3 ft. square, built of narrow maple strips fastened to canvas, to permit rolling. The legs are cross braced and connected. When collapsed, the piece fits into a case 36 in. long and 6 in. in diameter. The legs of the chair are arranged like those of the table, while the seat consists of a canvas square that buttons in place.



The Table Top Rolls and the Legs Collapse into Small Space, as is Shown Above



Strong When Open, Compact When Folded: Two Views of the Stool

THEFT PROTECTION OFFERED BY CHECKING ENVELOPE

For use in hotels and other places where guests frequently deposit articles of value with the management, a heavy Manila envelope with two blank checks attached to a gummed flap has been introduced as a container for such articles. After the envelope has been sealed, the owner writes his signature on one of the checks and takes the other as a receipt. To regain his property he presents the stub, indorses it before the clerk, and then surrenders it. Providing the two signatures correspond, the envelope is delivered.

FIRE STATION COMBINES BEAUTY AND UTILITY

An example of a municipally owned building which, though small, has been designed with an eye to the artistic, is a new fire-engine house in San Diego, Calif. It is finished in concrete and its outstanding features are

A Pleasing Example of Civic Architecture: A Small and Not Costly Fire Station Designed along Artistic Lines

a red-tile roof and a well-equipped hose-drying tower, 50 ft. high.

PLACARDED OFFICER HELPS ANTISPITTING CRUSADE

The Chicago Department of Health has inaugurated an antispitting campaign which is expected to be particularly effective because of the striking methods employed. An officer has been detailed to visit numerous insanitary places and disinfect them, employing for the purpose a spraying outfit labeled "Germ Killer," which is carried slung over the shoulder. On the officer's back is a placard that reads: "Because you spit in violation of law the Department of Health is compelled to disinfect."

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Two Views of a Chicago Health Department Representative Carrying a Disinfecting Apparatus and Decked Out with Posters Condemning Spitting

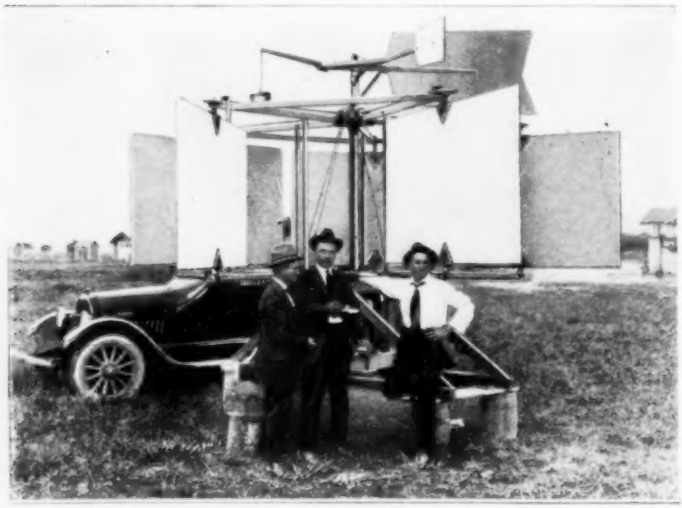
UNSIGHTLY BILLBOARD HIDDEN BY LATTICE

An artistic lattice has been erected in front of a billboard, in a residence district in Toledo, Ohio, that seems to be little more than a "spite fence," for it stands in a front yard near the boundary between two attractive lawns. The owner of the lattice is an advertising man, but evidently he feels that the particular piece of advertising on the lot next to his is out of place.

Lattice, to be Covered with Vines, Which Quite Effectually Hides the Big Billboard Erected on the Adjoining Lot

ODD WIND MOTOR IS BUILT FOR FARM IRRIGATION

Because of its radical design and claimed efficiency, a windmill conceived as a means of lowering the cost of irrigating uplands has attracted some notice. It consists of a series of large rectangular vanes pivoted to horizontal arms radiating from a central vertical shaft. They are geared to a controlling vane that regulates their adjustment. The experimental machine is 10 ft. in diameter and supplied with five vanes, 4 by 6 ft. in size. For heavy duty, however, a motor some 50 ft. in diameter with seven vanes, 10 by 20 ft. in dimension, would be constructed.



The Motor Revolves around the Vertical Shaft, the Top Vane Adjusting the Several Blades as the Direction of the Wind Changes

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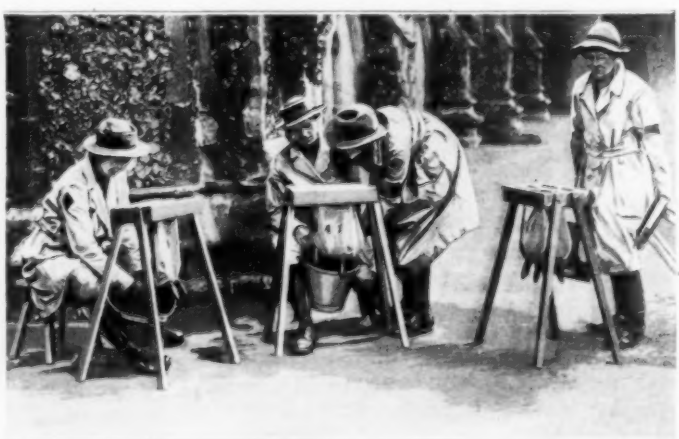
CProof of the harm done by smoke-laden air was furnished recently at a Chicago chrysanthemum show, when a large percentage of the show plants were blighted by smoke and fumes that entered the building during an intensely murky period.

AEROPLANE CONTROL GIVES FLIER USE OF BOTH HANDS

Tests lately conducted at the Rantoul, Illinois, flying field with a new aeroplane control that gives a pilot free use of his hands have been acclaimed highly gratifying. The device enables a craft to be maneuvered by movement of the knees so that in an encounter, an airman may reload a pistol or machine gun, operate a fire extinguisher, or do other necessary things without having to keep one hand on the wheel.

TRAINING DAIRY MAIDS IN RURAL ENGLAND

Inexperienced English girls learn to milk by means of a mechanical contrivance which cannot kick over the pail. After acquiring a degree of efficiency in this way they have no difficulty in handling cows. The picture was taken in the shadow of the medieval wall of the Benedictine abbey of St. Augustine, at Canterbury, now occupied by a missionary college.



College Course in Milking: How English Girls are Taught to Be of Use on Farms and Perform the Duties of Dairy Maids. The Artificial Cows Are Helpful for Instruction Purposes but Give a Poor Grade of Milk

Paying $200,000 to 5,200 Workers in Less Than 45 Minutes: Workmen at Camp Dodge, Iowa, Lining Up on Pay Day, According to Number, in 35 Runways, at the Ends of Which 35 Paymasters are Stationed

RUNWAYS EXPEDITE PAYING OFF ARMY-CAMP WORKMEN

By erecting 35 runways, each numbered and in charge of a paymaster, 5,200 workmen at Camp Dodge, Iowa, were paid off in less than 45 minutes. Each man took his place in the proper aisle and on reaching the teller called out his number, signed his name, and received his wages.

ARTIFICIAL EYE CAPABLE OF NORMAL MOVEMENT

To make the artificial eye practically indistinguishable is the aim of a British army surgeon who is experimenting with a ball made of cartilage as a substitute for a metal or glass one. A sphere of such construction when put in place establishes connections with blood vessels and the surrounding tissues. When thus fixed in the cavity it is supposed to be capable of movement corresponding to that of a normal eye and furthermore fills the space so that there is no depression, as is invariably the case when a shell is used. Although time must yet prove the practicability of the scheme, there is reason to expect that the war has brought forth another triumph in plastic surgery.

"CROW'S NEST" FOR CHIEF OF TRAFFIC OFFICERS

What has been called a "crow's nest" has recently been erected in Detroit's "Campus Martius"—the intersection of

Tower at a Busy Street Intersection in Detroit from Which an Officer Supervises the Control of Traffic

six important thoroughfares—from which a commanding officer has oversight of eight traffic officers located in various parts of the area. The structure consists of a circular inclosure mounted on a post so that the occupant

stands well above all passing vehicles. By means of levers he operates "Stop" and "Go" signs pivoted on the roof above him. At night these signs are illuminated, and being 20 ft. above the pavement, can be seen a long distance. The station is also equipped with an alarm with which officers as much as a block away can be notified of the approach of fire apparatus, ambulances, or other vehicles demanding special attention.

HUGE THERMOMETER TELLS PROGRESS OF WAR LOAN

During the second liberty-loan campaign a thermometer seven stories high was employed to register the "patriotic temperature" of Chicago and the district of which it is the center. The unusual sign was attached to a building at the corner of State and Madison streets. Whenever the new subscriptions warranted, the fire department was summoned and, while the crowd looked on with intense interest, the ladders were run up the side of the building, enabling the firemen to raise the arrow to the new total. Attached to a near-by pole was a siren horn and a red hand pointing to the thermometer. The former operated intermittently and was a persistent reminder that the "drive" was on.

Chicago Firemen Setting the Big Thermometer to Indicate the Progress of the Liberty Loan "Drive": Beneath Is a Bond-Sellers' Booth

HIGH ALTITUDES MENACE SWIMMERS

Numerous drownings occurring recently in lakes of high elevation have pointed out a serious menace to swimmers as well as the necessity for the utmost care on the part of fishermen or others from the lowlands who sojourn about such waters. It is a well-known fact that persons physically sound, dwelling in locations near sea level, find themselves short of breath under the slightest exertion when in high altitudes. Thus when such a person plunges into a mountain lake he finds that the exertion of swimming quickly exhausts his energies. Normal respiration is impossible and the heart action becomes dangerously rapid. It is the shortage of oxygen due to the elevation that accounts for some of the recent tragedies of Big Bear and Little Bear lakes in the San Bernardino Mountains. These lakes, more than a mile above sea level, are frequented by fishermen and pleasure seekers from the lowlands. Good swimmers find their prowess almost totally lacking in these waters, and an accident means almost certain death.

MIX CHEAP FUELS TO MAKE A SMOKELESS PRODUCT

By mixing anthracite culm, or slack, with about 20 per cent soft coal a smokeless fuel is obtained, it is said, that is well suited for our navy because fighting ships often need a fuel which will leave no visible trail to attract the enemy. Already considerable demand for anthracite culm has been manifest in the East.

A Monument Recently Unveiled at Brantford, Ontario, in Commemoration of Alexander Graham Bell's Invention of the Telephone: It Was the Purpose of the Sculptor to Embody the Suggestion of Broad Spaces in the Design

BELL-TELEPHONE MEMORIAL SUGGESTS WIDE SPACES

There has recently been unveiled at Brantford, Ont., in commemoration of Alexander Graham Bell's invention of the telephone, a beautiful monument whose wide spaces are peculiarly suggestive of the distances traversed by means of that instrument. The central feature is a massive bronze panel, standing against a granite wall at the top of a broad flight of steps. It represents man awakening to the possibilities of transmitting the voice long distances. Figures standing either side of the approach are depicted as communicating by telephone.

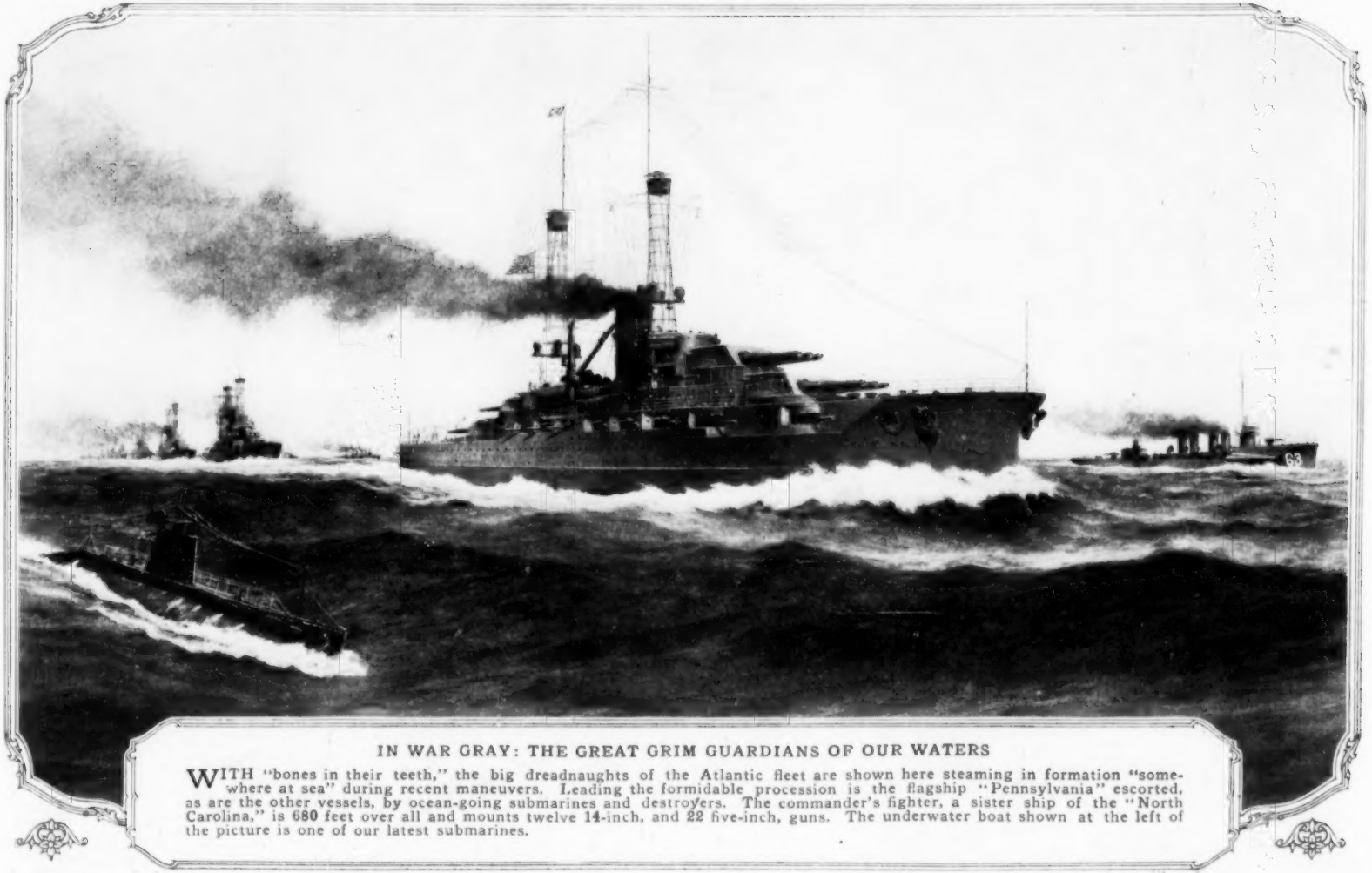
NEW AMERICAN AIR CRAFT READY BY JULY

It is the belief of persons in close touch with our preparations for aerial warfare that by next July the United States will be able to turn out all the aeroplanes that our government and our allies will need. It is our authorities' aim to make production in large quantities possible by the adoption of standardized parts. It is proposed, also, to utilize cut steel tubing in the manufacture of cylinders, instead of cutting away some 20 pounds of metal from each cylinder casting, as is done at the present time. By the newer method the output should be increased enormously. The first fighting plane wholly made in America of American materials has made successful test flights and it is thought that few changes either in the plane or the "liberty" motor will be necessary.

FAN ADVERTISES POPCORN IN THEATER LOBBY

A confectioner whose stand is opposite a theater box office advertises popcorn with the aid of an electric fan. The fan is arranged near the ventilator of the popper and blows the aroma into the theater lobby. Purchasing popcorn is thus forcibly suggested to all theater patrons.

The Aroma of Popcorn is Wafted to All Persons Entering This Theater



IN WAR GRAY: THE GREAT GRIM GUARDIANS OF OUR WATERS

WITH "bones in their teeth," the big dreadnaughts of the Atlantic fleet are shown here steaming in formation "somewhere at sea" during recent maneuvers. Leading the formidable procession is the flagship "Pennsylvania" escorted, as are the other vessels, by ocean-going submarines and destroyers. The commander's fighter, a sister ship of the "North Carolina," is 680 feet over all and mounts twelve 14-inch, and 22 five-inch, guns. The underwater boat shown at the left of the picture is one of our latest submarines.

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COMMENT AND REVIEW

THIS country has long been honeycombed with German spies. Every day or two some person who passed as a business or professional man, and who has been well regarded, is caught "with the goods" and arrested. Every state, every city, and every town harbors these agents or allies of the enemy who are masquerading as peaceable citizens. Our easy-going, think-no-evil way makes smooth sailing for pirate craft, right into the councils of state and city, and even our own homes. No country had ever so well organized and numerous a spy system as Germany has maintained right here in the United States under our very eyes. The constantly recurring incendiary fires, the ingenious lies of endless variety, are both part of the same underground system. The Chicago Herald has printed, run down, and exploded more than one hundred of these adroit falsehoods which would pass muster with most auditors. Here is where we can all be alert to spot and stop this propaganda. The next one you hear, run it down to its source. You will not get far before you reach some one who can't remember who told it. Anybody who is full of information favorable to Germany and unfavorable to our cause, and who can't remember where and from whom he acquired this news, will bear watching. Here is an opportunity for boys and girls, as well as grown-ups, to run down, locate, and explode this work of the propagandists.

Help Get the Spies

WITH our troops to France will go the largest, best organized, best equipped medical branch in the world's history. In the formation of this department we have had the benefit of the united experience of the English and French surgeons-general.

Our Medical Service

Few are aware to what an extent the doctors and surgeons of the country have responded. From no other profession or occupation has the percentage of volunteers been so large.

Ten months ago in the office of the surgeon-general, in Washington, there were only six assistants; and the total enlisted medical men in both army and navy numbered 420, including our territorial possessions.

When the call came, there were 143,000 physicians and surgeons in the United States. Immediately 25,000 of them volunteered for service. Of these, over 14,000 have already been commissioned.

The executive force in the surgeon-general's office has grown from six to over 200, and here are gathered each day and far into the night, and often all night, scores of the ablest surgeons in the land. Experts and professors from the largest medical schools and hospitals; doctors whose books are studied at home and abroad; surgeons who were earning a princely fortune each year, to whom patients traveled thousands of miles; others with more moderate incomes who could less well afford to do so, gave up their practice and have joined the medical branch. And these earnest men are rapidly forging into shape the largest and most efficient surgical organization the world has ever known.

BECAUSE we have so long been accustomed to thinking in a large way and doing on a large scale, it is hard for us to realize the importance of small things when multiplied by millions. It is a big mental drop from fifteen billions for war expenses, to a lump of sugar, or so, more than actually necessary in a breakfast cup of coffee. If we can't make a saving of hundreds or thousands, the saving of a little soap, or light, or fuel, or bacon seems so insignificant as to be useless, if not actually ludicrous. And right here is where we skate on thin ice. It is easy to think in terms of bread tickets and regulated rations of butter and milk and all eatables for Germany and the other European countries, but it is hard for us to see any necessity for great economy in food here.

Victory in Small Things

If we will avoid that same condition here we must wake up and get busy. Some of us already have, but most of us have failed to grasp the problem seriously,

and still think of food conservation as intended for some one else. The American Army at Valley Forge went barefooted in the snow and lived mostly on corn bread, and with what a spirit! There should be no occasion for us to go either barefooted or hungry, but we need more of their indomitable, resistless, unconquerable spirit, that accepts such sacrifices as we are permitted to make with the same glad, cheerful willingness. Have we lost the spirit of '76? It is not lost, but hid; it lies dormant because we have not had our Valley Forge to awaken it for more than half a century. But how much nobler and better voluntarily to arouse our sleeping patriotism to white heat and so avoid distress! The fact is, with the exception of the few remaining veterans of the Civil War, our liberty has personally cost us nothing, and like other gifts, we don't half appreciate it.

When the present war began it was to end in six months; then one year; then three years; and already it is well into its fourth year. German propagandists in our midst would lull us to inactivity with sagacious predictions that it cannot last through 1918. But at this very moment every man, woman, and child in Germany and Austria are bending every effort, are stopping at no sacrifice that their selfish cause may win.

Shall a single one of us do any less than any one of them, to hasten victory and insure Liberty for all the World?

Saving Is a Pleasant Habit

VOLUNTARY saving in a good cause becomes one of the real joys of life, even though those who never tried it may dispute the fact. Many a widow has put in long hours every day, for years, to educate her son; many a father has worked overtime and worn old clothes to enable a daughter to study music. And of all such parents you have known, did you ever hear one complain at the sacrifice?

Of recent years correspondence and free schools, scholarships, and the greater opportunities for both young men and young women to earn part or all of their way through college, have made things a bit easier for many parents. Millions therefore have not been actually forced to save, and were content to spend all they earned.

But now we must all be saving. Those who have been thrifty can be more so; those who have disregarded the matter must learn how to become so. If only this nation learns thrift as a result of the war, that will be one of the greatest of the few blessings it can bring to us.

And what an inspiration for saving and giving, each his bit according to his means! The great majority of us who cannot go across the sea may yet have our part, each one in helping the great cause. If we can only once see and realize the absolute necessity for doing something, doing everything, the result will be stupendous, irresistible; and the satisfaction will be one of the best joys of life.

Get the Spirit of Giving

RECENTLY I spent some hours with that most interesting collection of thousands of relics of the Civil War, gathered and guarded by the Daughters of the Confederacy, and housed in the Jefferson Davis home, at Richmond. Flags from every great battle, uniforms worn by valiant officers, documents famous in the annals of that war, and countless articles each having its own special history, all are there.

But the rooms which interested me most were those containing the household articles and wearing apparel made by the women of the South—women of wealth, culture, and refinement who had never known what it was to do work of any kind. When the day of necessity came these women, with only the crudest implements, spun and wove and sewed for both their men and themselves. To them the transition from broadcloth and the silks of Paris to these rough homemade garments was a tragedy, but the spirit was heroic.

In the present crisis the women of today are not likely to be called on to make any such sacrifice; if necessary they will do it just as nobly as did the women of the South.

Shall the spirit of service in our men, old and young, be any less earnest and determined?

Exert Utmost Effort

WE have accomplished so much, and so rapidly, that a certain feeling of assurance of success in anything we undertake is natural and not necessarily egotistic. America and England have far outstripped all other nations in those inventions which have moved the world forward in its greatest physical advances. At the beginning of the war Germany had the largest artillery and most deadly shells ever made; but Germany did not invent cannon nor shrapnel. She has made significant for the first time the submarine; yet the submarine and torpedo are not German inventions. The steam engine, the steamboat, ironclads, electric light, telegraph and telephone, wireless, the aeroplane, the tank car, and many other mechanisms employed in war today, are not of German invention. Sir Berkely Moynihan, head of the British Medical Service, says: "Not one single discovery of first importance in the science or the art of surgery can be placed to the credit of the Germans."

Nevertheless the knowledge of these very conditions will be our great misfortune and may cost us dearly, if, in consequence, we permit our minds and energies and efforts to lag for a single instance: for while the German has lacked initiative he at present leads the world in organization and method.

Cold or Coal

FIFTEEN million people in this country are shoveling coal today, of whom 250,000 are firemen in power plants and on railroads. By midnight they will have converted 2,300,000 tons into ashes. With these ashes will be thrown away thousands of tons of coal only partly burned. Other thousands of tons will have been wasted in careless burning, or unnecessary heating of unoccupied rooms; in the making of electric light which illuminated empty rooms and needless places. In twelve months we have burned 600,000,000 tons.

Of late we have increased our consumption of coal much faster than it can be delivered; our mines are adequate—with sufficient labor—to produce what we need, but transportation is limited. During the past year the steel industry has used 40,000,000 tons more than the previous year; our cotton mills, 4,000,000 tons; our railroads, 40,000,000 tons—while other industries bring the increase up to 100,000,000 tons. A single new munitions plant alone takes the entire output of two large mines. Our own Navy and our Allies' constitute a new and large demand for fuel.

Coal has always been so abundant here we have given little thought to saving it. We must manage some way to save at least 50,000,000 tons. The damper in your stove, furnace, or heater can help win the war; a door in your ash pit which leaks air, and soot in flues, pipes, and chimney are all aiding the enemy. Weather strips, storm sash, ash sifters, careful firing, a curtailment of coal fuel just as much as possible, are all instruments of first aid to the Great Cause. Shall we force our Government to take over the coal industry as England, France, Italy, Russia, and Germany have already done, or shall we relieve the administration of this extra burden by taking the situation seriously? Every owner or manager of a plant using coal can do a lot. How long, Mr. Manager, since you inspected your boiler room, and do you know of your own knowledge whether the utmost fuel economy exists there, or not?

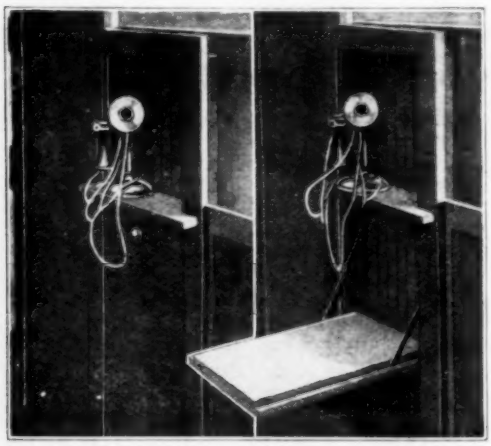
It is of very great importance to save every pound of coal possible, for if we don't, a lot of factories not absolutely essential to war supplies will have to close down. How much better we should all, large and small users alike, exercise economy and prevent embargo.

H. H. WINDSOR

November Twenty-seventh.

BUILT-IN CONCEALED WALL SEATS FOR ODD CORNERS

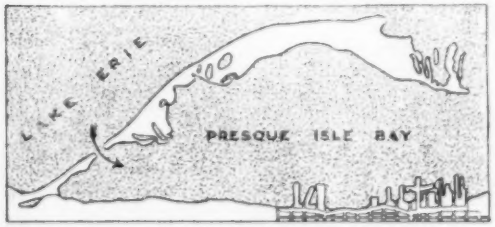
Built-in disappearing seats for offices, anterooms, kitchens, and other places where chairs cannot with convenience be placed permanently, have been introduced. They are all of the same general character and vary only in size. One, for instance, consists of a wooden slab so hinged and provided with steel hangers that it may be flush with a wall when not in use, and at right angles to it when needed for sustaining the weight of a person. Installed beneath a telephone shelf, such a device provides a serviceable seat that is out of view when not in use.



When Not in Use the Seat Folds Flush with the Wall; At Other Times It Rests Horizontally

STORM MAKES PENINSULA AT ERIE AN ISLAND

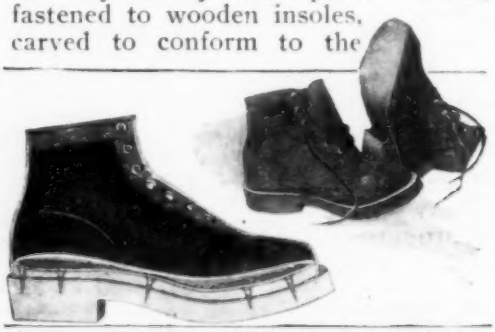
The peninsula, some six miles long and two miles wide, that shelters the harbor of Erie, Pa., and is known as Presque Isle (French for peninsula), became an island in truth a short time ago when a violent storm cut a channel through its narrowest part, close to where it joins the mainland. The passageway was 80 ft. wide and 19 ft. deep. Shrubbery and trees have been planted in an effort to reinforce the shore line.



Map of the Water Front at Erie, Pennsylvania, Showing the Storm-Made Channel Which Changed a Peninsula into an Island

LEATHERLESS, WOODEN-SOLE SHOES NOW MADE HERE

Leatherless, wooden-sole shoes, having some resemblance to the European-made sabot, are now being manufactured in this country. They are especially adapted for use by farmers, dairymen, workers in canneries, packing houses, etc. It is said that they can be sold considerably cheaper than leather shoes. The uppers are made of very heavy waterproof canvas, fastened to wooden insoles, carved to conform to the shape of the foot. Screws fasten the insole to a ¾-in. alder sole, which is cut from a block with a band saw. A cloth sole is glued over the insole to protect the wearer's foot from the screw heads.

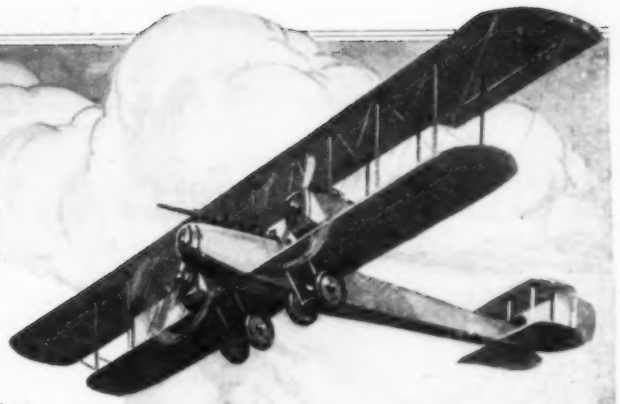


American-Made Shoes with Wooden Soles and Waterproof-Canvas Uppers: It is Said that This Footwear can be Sold for Much Less Than Leather Shoes and that It Wears Longer

¶The 24-hour time system has been ordered adopted by all Greek railways, posts, telegraphs, the army, navy, steamship companies, etc. This action brings the Greek transportation schedules in line with the Italian and other continental systems. The day begins at midnight and the hours are numbered up to 24 o'clock.

THE WASP'S NEST

By E. T. BRONSDON



THE first rule to observe when visiting any spot in the actual war zone is, "Keep mum! Learn all you can with your eyes, but do not seem to wish or to encourage explanations!"

The lieutenant was in good sorts; the day previous he had annexed the honors of his thirtieth German warplane, and he was willing to tell a visitor from his side of the pond—for over there Canadians and Americans consider themselves as blood brothers, though neither is quite accepted as such by the English—all about it.

Had it not been for X's good humor that particular day together with a lucky (for me) coincidence, I never would have got more than a glimpse of Patricksbourne. As it came about, X himself took me for a long ride out over the channel, and I saw —but more of what I saw later.

Patricksbourne is one of the many securely "camouflaged" aerodromes that lie between Ramsgate and Margate, England. There approximately 200 air craft of all kinds and descriptions are housed, and sent out on their various missions over the battle front daily. The airmen sleep there, too—such sleep as they get.

From the air, Patricksbourne is one of the most convincing limestone quarries I have ever seen. The hangars are all painted to resemble ledges, and artists have given perspective to the center field by means of streaks and splashes of paint, fantastically applied

"From the air, Patricksbourne is one of the most convincing limestone quarries I have ever seen."

to the turf, which seems to let the center sink to the depths of Devil's Gorge.

But not all the aerodromes are quarries, by any means. Just a little to one side of Patricksbourne is another which the Huns doubtless have charted as a thick pine forest, while farther on is still another which, from 10,000 feet in the air, is nothing but a stretch of open moor.

The two main varieties of airplanes now in use by the English and Canadians are the new "secret" scout monoplane and the 100-ft. spread battleplane. Both of these were much in evidence at Patricksbourne.

As I have said before, questions are not in order when you are visiting, but eyes and ears pick up quite a little if used with vigilance. I did not ask X for mechanical details on the "secret" scout—so-called because the Germans would give 10,000 men and a Zep in the bargain to learn the details of construction—but the lieutenant vouchsafed the information that it was a "darling in the air," that it made 145 miles an hour, while the fastest speeder the Huns possessed could not touch 140, and that one man could handle it and still have a chance to use a machine gun. To me it looked, after seeing one of the little speeders—with almost no wings at all—as if that chance would be about as good as Dario Resta's chance to play Canfield while engaged in trimming Ralph de Palma. But I didn't ask how; if you open your mouth they won't even tell you the time of day or the right road to the next town.

The one-hundred-footer—X took me for a ride in it—was a biplane with two foreign motors, developing each approximately 140 horsepower. It has a seating capacity of eight, but usually, when in use for bombing or air fighting, the crew consists merely of the pilot, a mechanician, and one gunner. The pilot is the only man who is strapped in; the others have to crawl back into a covered space in the fuselage when the craft flies upside down.

Strangely enough, the life of the airmen of the Royal Flying Corps at Patricksbourne—and, in truth, of all the airmen not in the Naval Flying Service—has become reduced to a queer routine. This is true also, to some extent, of the navy fliers, but not so much. Before arriving at Patricksbourne I had heard the common rumor in London that the Huns always arrived "according to schedule," but I had thought it merely talk.

But X took it very seriously. "Yes," he said, "we know, and the Germans know we know, just exactly when air raiders are going to appear over London. The Huns raid every third day, and they appear over the outskirts of the city exactly at eleven in the morning!"

"But I should think that you could be ready for them, and annihilate every party!" I expostulated.

"We are ready, in a way," he answered soberly. "The devil of it is that this plan of the Germans is too transparent. Nothing would please me better than to take a big air squadron up and 'get' every one that dared cross the channel, but that can't be done. Our 'edge' in the air on the French front is too precious. You see, the Germans don't do much damage when they raid; they even have ceased to try to do very much. The idea simply is to make the people clamor for a big defensive force of airplanes over here. Then, the moment the government acceded to that pressure, and took away some of our planes from the French front, there would never be another German raid here. They simply would overpower what we would have left across the channel.

"You see, a preponderance in the air is vital to the allies just at present, as it always is to an advancing army. The Germans, in falling back, can chart every tree, every mound, every clump of weeds if they wish, and have no real need of aerial range finders or fire directors. They can sweep every millimeter of the country which they have held, for they know it like a book. On the other hand, we are going into strange territory; if we can't have airmen up all of the time, our advance is

like that of a blindfolded man trying to feel out the territory with a cane."

I have been lucky enough to be in London at the time of one of the most pretentious of the raids. Thirty-three of the German planes had appeared—and as I think back, it was at eleven on a Sunday morning. They were flying at an altitude of approximately eight or nine thousand feet, in a perfect "V." As they approached, the English antiaircraft guns got busy, and I saw the black puffs of shrapnel seemingly bursting all around them. Not one was hit, however.

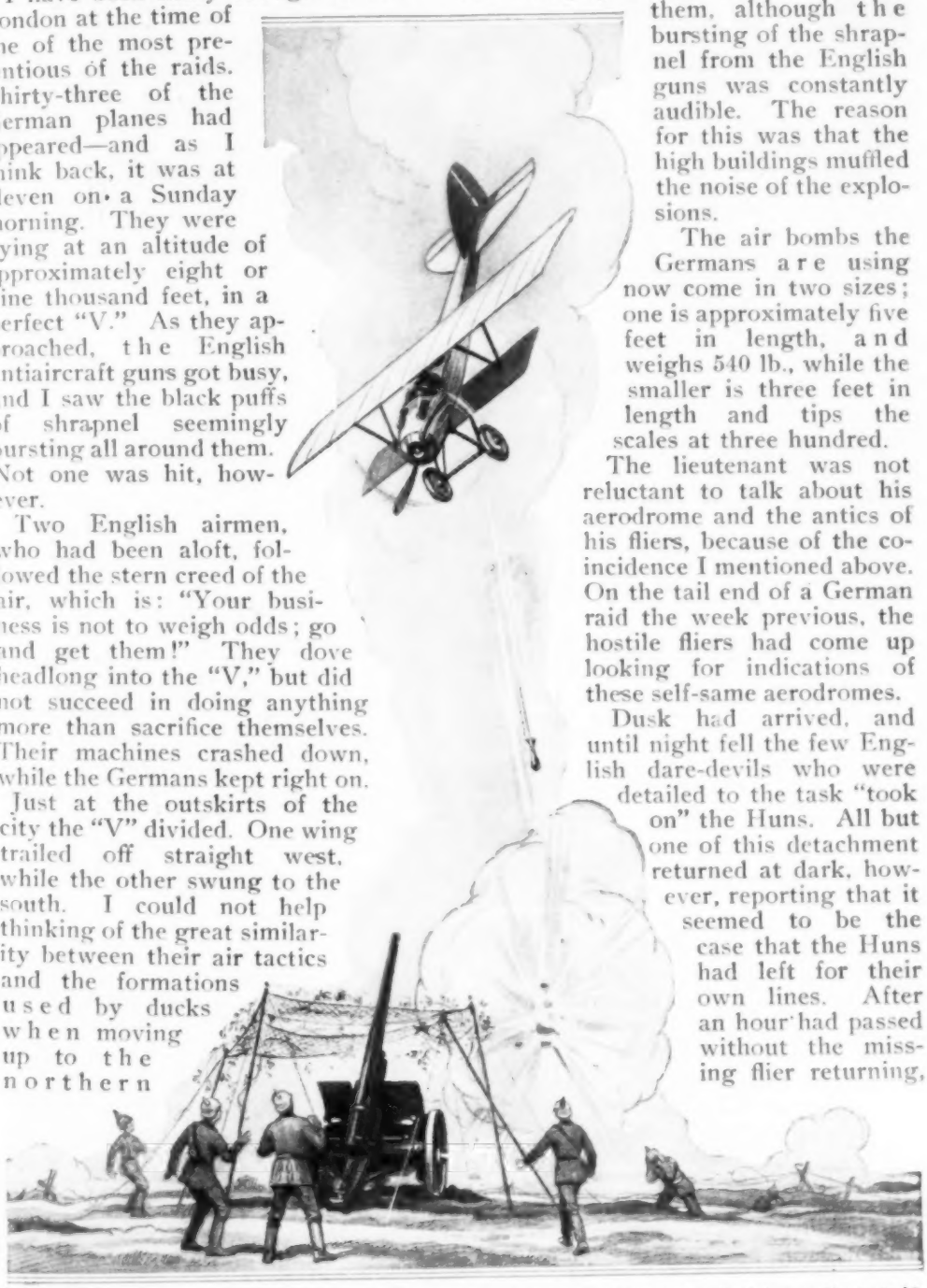
Two English airmen, who had been aloft, followed the stern creed of the air, which is: "Your business is not to weigh odds; go and get them!" They dove headlong into the "V," but did not succeed in doing anything more than sacrifice themselves. Their machines crashed down, while the Germans kept right on.

Just at the outskirts of the city the "V" divided. One wing trailed off straight west, while the other swung to the south. I could not help thinking of the great similarity between their air tactics and the formations used by ducks when moving up to the northern wild-rice fields. The papers said that a great number of bombs were dropped, but strangely enough I heard none of them, although the bursting of the shrapnel from the English guns was constantly audible. The reason for this was that the high buildings muffled the noise of the explosions.

The air bombs the Germans are using now come in two sizes; one is approximately five feet in length, and weighs 540 lb., while the smaller is three feet in length and tips the scales at three hundred.

The lieutenant was not reluctant to talk about his aerodrome and the antics of his fliers, because of the coincidence I mentioned above. On the tail end of a German raid the week previous, the hostile fliers had come up looking for indications of these self-same aerodromes.

Dusk had arrived, and until night fell the few English dare-devils who were detailed to the task "took on" the Huns. All but one of this detachment returned at dark, however, reporting that it seemed to be the case that the Huns had left for their own lines. After an hour had passed without the missing flier returning,



"At this point, while the rival gunners are standing with mouths open watching their gallant foeman plunge to his death, the plane suddenly rights itself, drops its load of bombs, and is off again."—*See page 24.*

X set out a red-light signal. Almost instantly came a rain of bombs from the blackness above! The Germans simply had gone to the upper air to await some such indication, and when it came, they used up all the remaining ammunition they possessed, and then returned. Wreckage of the English flier was found next day.

All the camouflage that had been put in on the aerodrome then was useless, of course, for even though it was night, the Germans were able to orient themselves sufficiently to chart the position of the hangars. Each time they came over after that, they bombed Patricksbourne. This was not as sinister as it sounds, however, for the aim of airmen out of reach of the antiaircraft guns (above 10,000 ft.) is not accurate enough to do much damage. At the time I was there they had succeeded only in smashing one hangar, and plowing up the ground rather impressively.

The Germans are far inferior to the allied fliers at present in the little tricks, as the crumbled fortifications of Antwerp now show. They do not know how to launch bombs to the best effect.

X told me that about a year ago the British first started using the nose dive; this is one of the most spectacular of all the air stunts. It consists of flying at an altitude of from 10,000 ft. up, locating the target and getting perpendicularly above it, shutting off the motor, and dropping, nose down, like a fluttering leaf attached to a tiny twig, to within a thousand feet of the target. At this point, while the rival gunners are standing with mouths open watching their gallant foeman plunge to his death, the plane suddenly rights itself, drops its load of bombs and is off again before the gunners can get the range.

Of course, the Germans are getting on to this now. Some of them even are trying it themselves, while their gunners have become so skeptical of "disasters" to the enemy, that they will fire at even a plane that is really falling, all the way to the ground.

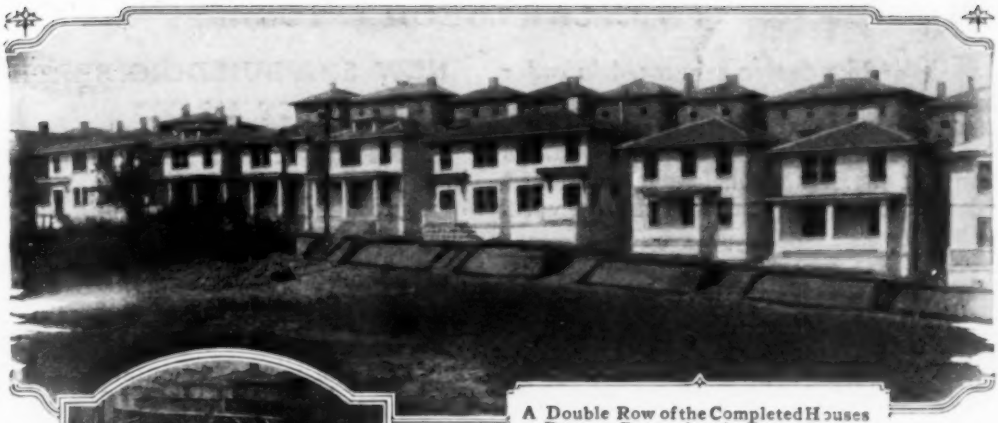
The regular method that has been used by both the Germans and British for escaping, once the enemy has located a plane in the air with the antiaircraft guns, is to tip the plane sidewise, almost to the point of sideslipping, presenting only the edges—a much smaller target—to the enemy, while rising or wheeling away.

This method has one big disadvantage: it is very apparent to the gunners below. Ordinarily these men have very little that tells them whether their fire is close or hundreds of meters away from their flying targets. Immediately an airman signals that he is in distress, by turning on his side in this fashion, the gunners know that they have his range; then the fire of all the guns is concentrated on him at the range being used, and usually he falls.

X had developed a better trick than this. When the shrapnel was bursting too near him for comfort, instead of tipping his plane sidewise toward the enemy, he poked the nose up. Thus he could mount—a thousand feet a minute—out of the range of the guns, and at the same time he was offering a smaller target than even the side view of the plane, and the gunners below could not tell, at heights above 6,000 ft., whether he was flying in a straight line, undisturbed by their fire, or running away.

HUNDRED RESIDENCES BUILT AT RECORD PACE

By applying the methods used in constructing large buildings, 100 four, five, and six-room fireproof houses, ranging in cost from $2,000 to $3,300 each, have been erected at Donora, Pa., at the average rate of one in three days. All of the residences are of the box type and built of reinforced concrete. To give them a more artistic appearance than they otherwise would have, spruce framings covered with asbestos shingles were raised over the flat cement roofs. The architecture of the buildings was varied somewhat and



A Double Row of the Completed Houses at Donora, Pennsylvania, Erected at the Rate of One in Three Days, is Pictured Here

The Forms Set and Everything in Readiness for the Concrete to be Poured

The Structures were Built One Story at a Time. Above: The Concrete is being Poured for the Upper-Floor Sections

Excavations Made and Steel Forms being Placed for a Row of the Fireproof Dwellings

As Soon as the Concrete Set and the Forms could be Removed, the Roof Frames were Erected and Shingled and Another Row of Buildings Started

those of like design separated in order to escape monotony. All of them, however, have characteristics in common. They were constructed in groups so that the standardized steel and wood forms employed could be used several times.

SAN SALVADOR VOLCANO SWALLOWS UP LAKE

A remarkable phenomenon, but one little commented on, that occurred in

Photograph Taken on the Volcano at San Salvador, Shortly after Its Eruption, Showing the Seething Crater That Now Takes the Place of a Small Lake

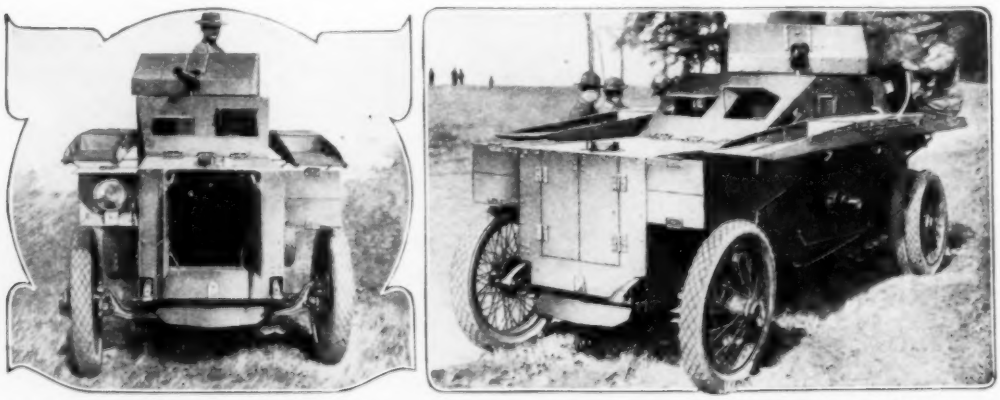
connection with the eruption at San Salvador was the disappearance of a wood-surrounded lake that formerly existed on the volcano. The accompanying photograph, taken by an intrepid traveler at some personal risk, shows the seething crater, which was all that remained of the lake that he had rowed upon shortly before the catastrophe.

NEW SHIPBUILDING BERTH LARGEST IN CANADA

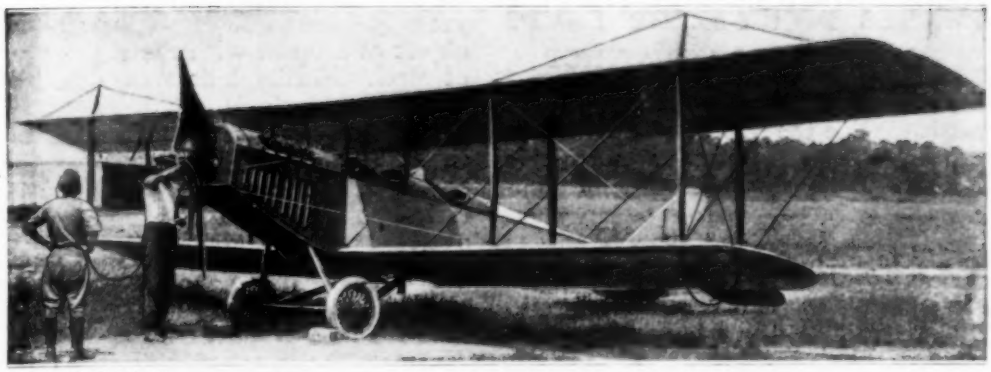
There has recently been completed in Montreal an inclosed shipbuilding berth said to be the largest in Canada. It is a double berth, and is 500 ft. long and 152 ft. wide. The height from the floor to the bottom cord of the roof truss at the land end is 74 ft. 3 in., and at the water end, 99 ft. 8 in. About 1,000 tons of steel was employed in its construction.

HOME GUARD IS EQUIPPED WITH FIGHTING MOTORS

Two armored motor cars, each mounting a Lewis machine gun in a revolving turret, form part of the equipment provided for the St. Louis, Missouri, home guard through popular subscription. They carry crews of five men each, make about 57 miles an hour on good roads, and are built to withstand rifle fire and grenades. All parts of the vehicle, excepting the wire wheels, are protected. Hinged plates cover the radiator and head lamps and are controlled from within. Steel skids, which when properly laid enable the machines to climb onto flat cars or cross trenches, are carried on brackets above the wheels on each side. A crew is divided so that the pilot and gunner each have an assistant, and an observer is stationed at the rear.



Left: Front of Car Showing the Radiator and One of the Lamps Uncovered. Right: Front Entirely Closed Ready for Action. The Steel Skids are Supported on Opposite Sides above the Wheels



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By Delivering Its Power near the Center of the Blades, This Odd-Shaped Propeller Gains Efficiency and is Relieved of End Strains That Have Snapped Many a Blade

ODD-SHAPED PROPELLER INCREASES EFFICIENCY

Increased speed and efficiency as well as a reduction in the danger of breakage while in flight are features of a propeller of most unusual design recently given its preliminary tests. A glance at the construction reveals that, unlike propellers of conventional design, the greatest area of power delivery is near the base of the blades. This tends toward increased motor efficiency, by permitting a more perfect pick-up of the air, as well as allowing the motor to turn with less resistance. It is obvious that with the driving area principally in the vicinity of the shaft, there is but little strain on the blades in the transmission of the power.

DENVER PLANS TO RAISE SHEEP IN ITS PARKS

The city of Denver, profiting by the example of European estates and certain eastern cities, proposes as a patriotic measure to pasture sheep in its public parks, thereby increasing the wool supply and releasing for other work the men now required to mow the grass. It is estimated that there is grazing area for 3,000 sheep in the parks in Denver itself and that the extensive mountain park, or reserve, near by, could support 5,000 ewes and lambs. By purchasing ewes for lambing it is believed that the city can make a handsome profit on wool and mutton. If all cities of 50,000 or more would follow this practice they could probably support over 150,000 sheep each summer.

WELL-DESIGNED COAL HOUSE OWNED BY FARMERS

For the convenience of its members, an agricultural coöperative association has erected at Randall, Ia., a coal house of modern design. It enables farmers to have screened fuel of uniform quality delivered into their wagons without the delays that obtain when the loading is done manually. The shed looks somewhat like a hybrid grain elevator and has seven raised bins with a total capacity of 530 tons. A conveyor hoists coal from cars on an adjacent siding to the storage compartments. Subsequently it is discharged by gravity through screened chutes to wagons in a driveway running through the central part of the structure on the ground floor.

At Their Own Coal House the Farmers Get Efficient Service and a Product of Uniform Quality

SHADES FOR STREET LAMPS IN RESIDENCE DISTRICT

Curved metal shades have been installed inside the frosted globes used in the lighting system on a north-side boulevard in Chicago, to prevent the bright lights shining into nearby homes. The shields also serve as reflectors and are fastened by asbestos-padded clamps to the necks of the lamps. Before this means of shading was used half of each globe was painted black on the inside, but this detracted much from the beauty of the ornamental lights and required renewing frequently. The metal shades have proven more economical and at night are more satisfactory in appearance, while in the daytime they are not visible at all.

ENORMOUS STANDPIPE SOLD FOR JUNK

Because of the present scarcity of steel an old standpipe, abandoned ten years ago, sold as junk recently for $2,000, including the cost of its removal. The structure was 77 ft. high and 30 ft. in diameter. Engineers computed that it contained 114 tons of metal. The huge tank, which for many years had been an eyesore, became the object of interest with the rising price of steel. Finally bids were asked on its value as junk.

Men with oxyacetylene torches cut through the metal of the base, while others at the end of a long rope attached to the top pulled the great pipe over. It crumpled as it struck the ground as if it had been made of paper.

WEDDING GUESTS REQUIRED TO BRING BREAD CARDS

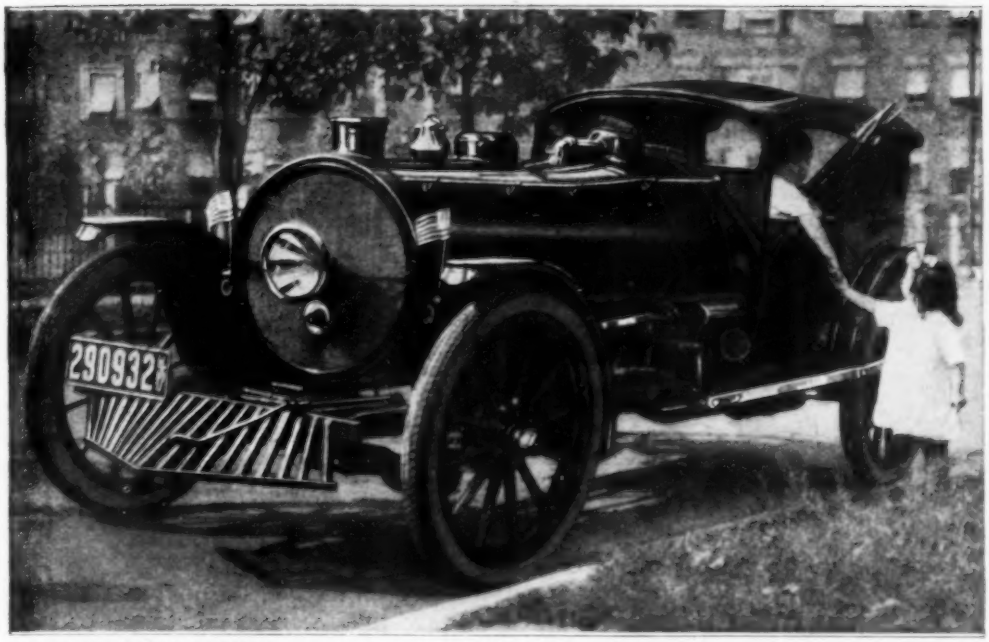
In such sorely pressed neutral countries as Sweden the war has resulted in rich and poor alike being subjected to many restrictions heretofore unknown. An illustration of this—not without its humorous aspect—is found in a Swedish wedding invitation recently received in this country by friends of the bride and groom. The latter were members of two wealthy families in Stockholm, and the handsomely engraved missive included an invitation to a banquet at one of the finest hotels in the Swedish capital. It was in a notation at the bottom page that the hand of war manifested itself, in these words: "Please bring your bread cards." This meant, of course, that well-to-do hosts at a wedding could not provide their guests with bread, except in restricted amounts and in the manner prescribed by law.

¶It is reported that Orville Wright is experimenting on a small aeroplane that is designed to occupy the same place among air craft that certain low-priced cars do among automobiles.

Men with Oxygen Torches Cut the Structure Off at the Base

The Falling of the Great Tank Afforded a Thrilling Spectacle

The Standpipe as It Appeared after Crumpling to the Ground



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As the Queer Machine Rolls along the Boulevards It Emits a Businesslike "Choo-Choo" That Makes It Seem More Than Ever Like a Dwarfed Locomotive

AUTO-LOCOMOTIVE IS SLEEK GREYHOUND OF BOULEVARD

One of the strangest gasoline automobiles that has ever made its appearance on the parkways of an American city has many of the external appearances and internal features of a railway locomotive. Constructed at an approximate cost of $10,000 for the personal use of its designer, it is an air-controlled machine that is propelled through side rods, and is capable of making more than 60 miles an hour. From cowcatcher to cab it holds the attention of those who see it for the first time.

SHOCK-ABSORBING CAP IN STEEL HELMET

A new steel helmet, having a low rounding crown in which is a felt skullcap, covered with oilcloth and designed to give the headgear shock-absorbing qualities, has been proposed for use by the American army. It is so attached to the crown that the latter has a little play when struck by a missile. A sloping brim protects the neck and a beaklike visor that can be drawn down over the upper part of the face is provided with heavily slatted openings for the eyes.

COURTESY INDIA RUBBER WORLD

Steel Helmet Proposed for Use in the American Army, Having a Felt Cap within the Crown and a Movable Visor to Protect the Eyes

¶After having been under construction for six years, the pier at Yokohama, Japan, has been completed. It is 1,200 ft. long, 138 ft. wide, and the depth alongside has been increased from 26 ft. at low spring tide to 35 feet.

MEMENTO SEEKERS DEFACE JESSE JAMES MONUMENT

A curious disregard for the rights and feelings of living relatives of the dead has been manifested by a portion of the American public in its treatment of the simple brown shaft that marks the grave of Jesse James, the notorious outlaw of pioneer days, at Kearney, Mo. From the base of the monument to its top, relic seekers, whose standards with respect to things sacred suggest those of the bandit himself, have broken off chips of stone.

AUSTRIA CONDEMNS MANY FOR READING MESSAGE

In an effort to show the necessity for the general amnesty recently proclaimed by Emperor Charles of Austria, a Vienna paper has summarized the terrible work of a court-martial in connection with the case of a girl whose offense was that she had picked up and passed on a copy of a proclamation made by the Russian government early in the war, and dropped by a Russian airman. The young woman was condemned to death for reading this document and sending it to an uncle, who copied it in his notebook, and read it aloud to an employe, ordering him to copy it. The uncle and employe received the same sentence as the girl, as did three others who dared to read and pass on, or copy, the message. In addition to the six condemned to death, 33 were sentenced to terms in the penitentiary aggregating 91 years of confinement.

A GOOD CIVIL ENGINEER—THE FIELD MOUSE

By LOUIS B. LAWRENCE, B. A. Sc.

WE had dug holes for the poles of our new transmission line extending between the power house and a new pumping plant. A field mouse trotting around tumbled into one of them and was imprisoned during the night. Making my usual morning inspection of the work, I noticed the little fellow running around the bottom of the hole trying to find some means of escape. When I came back from my tour, he had settled to business. He was digging, steadily, a spiral groove round and round the inner surface of the hole with a uniformly ascending grade.

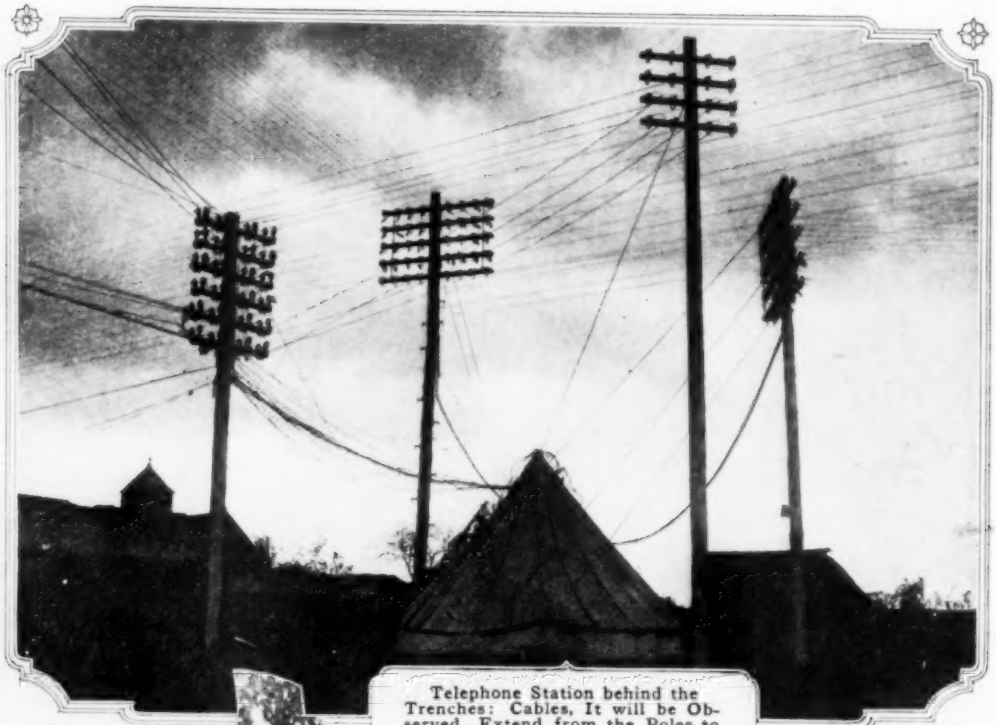
Curious to know how he would manage the three-foot ascent, I had another hole dug, and watched him go on. He worked night and day, but the work was slow, and I brought him some food. As he got farther from the bottom, he dug little pockets where he could sit and rest.

At the end of two weeks, the little engineer struck a rock too big for him to move. For nearly a day he tried to get around it, but without success. Then, with wonderful patience and unflinching courage, he dug another pocket, reversed his spiral, and went on tunneling his way in the opposite direction. At the end of three weeks he was coming near the top. Morning came: the mouse had sped away, his spiral road completed.

STUPENDOUS ALPINE STRUGGLE AWAITS ITALY

What the Italians have Done and, in View of Their Tragic Reverses, must Do Again is Shown Here. Days of Herculean Effort Often Attend the Placement of a Single Gun in an Advantageous Position. The Picture Gives a Faint Idea of the Nature of Such Operations and the Daring Skill They Require

IN THE WESTERN THEATER WITH THE CANADIANS



Telephone Station behind the Trenches: Cables, It will be Observed, Extend from the Poles to the Circular Tent in Which "Trouble Men" are Continually Engaged Testing the Various Lines

Wounded Canadian Leading to Rear a German Prisoner Suffering from Shell Shock

Canadians Carrying Water to Their Comrades in the Trenches on Hill 70, after the Advance near Lens: The Effect of the Bombardment Is Apparent

CANADIAN WAR RECORDS COPYRIGHT

"OVER THE TOP" AND "CARRY ON"

"Over the Top" with the Dashing Poilus: Three Pictures of Three Actual Minutes of Life and Death in the Inferno of "No Man's Land"

"En Avant!" Silhouetted against the Smoke of the Barrage Fire, the Detachment Breaking through the Maze of Entanglements to the Boche

"Carry On!" Wounded Poilu Staggering Back to His Own Trench as His Gallant Comrades, Visible in the Distance, Reach Their Objective

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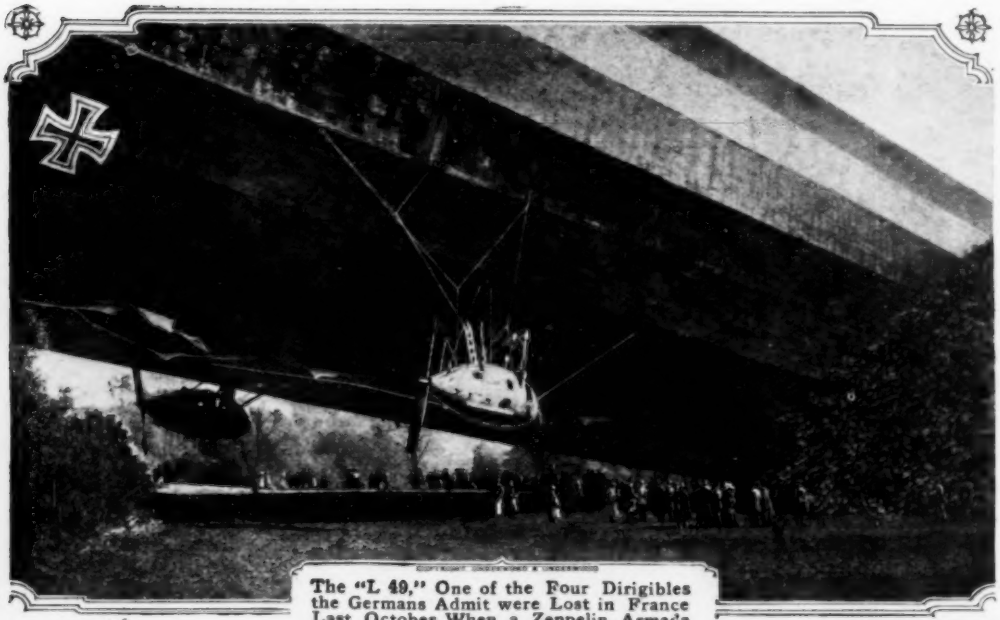
ZEPPELINS FALL INTO HANDS OF FRENCH

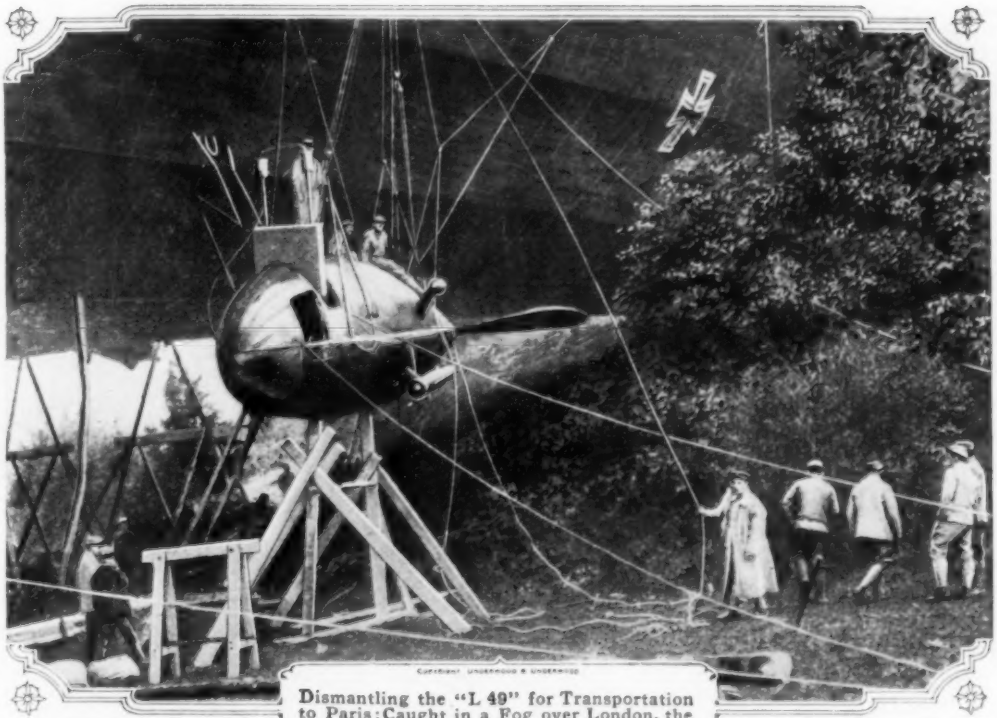


The "L 49," One of the Four Dirigibles the Germans Admit were Lost in France Last October When a Zeppelin Armada was Returning from an Aerial Attack on London

Aeronautical Instruments and Equipment Taken from the Zeppelin Pictured Above and Below: The Craft, Captured in Almost Perfect Condition, Is Now in Paris

By a Rare Piece of Fortune a French Hunter Happened Here When the Big Gas Bag Descended. Covering the Crew with His Shotgun, He Prevented the Destruction of the Dirigible

AFTER LAUNCHING BOMBS OVER ENGLAND



Dismantling the "L 49" for Transportation to Paris: Caught in a Fog over London, the Zeppelins became Lost. Strong Air Currents Carried Them into France. Lack of Fuel Prevented Them from Returning to Germany

Ready for the Concentration Camp: Crew of the "L 50" being Removed from a Motor Truck after a Trip from Dammartin, Northeast of Paris, Where the Craft was Brought Down

SAMMY PREPARES TO MEET FRITZ IN TRENCHES

Some of Our Boys in a French Training Camp Ready for the Gas Drill, during Which They are Subjected to Actual Trench Conditions

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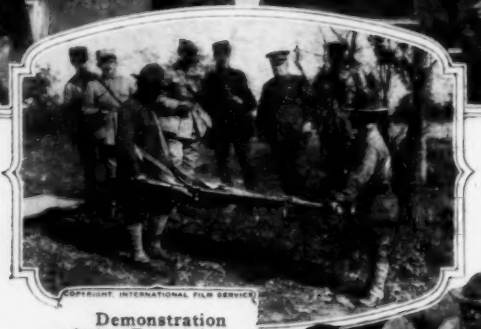
"Eagle Hut," on the Strand in London, the "Triangle" Headquarters for All Allied Soldiers and Sailors, Showing Ambassador and Mrs. Page Departing after Participating in the Opening Ceremony



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Demonstration before French Army Officers of New Trench Stretcher Devised by a Lieutenant in the Medical Corps

"Somewhere in France:" Americans Disassembling Machine Gun While Blindfolded. Such Training will Be of Value Later When Emergencies Make Repair and Adjustment of Pieces Necessary at Night

FIRE AND SAMMIES HERE AND OVERSEAS

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With Our Boys in France: Members of the Gas and Flame Service Training for the Spring Offensive. The Picture Gives One a Clear Conception of the Effect of Liquid Fire on Troops That Face It

Fire Raging in the Frame Barracks at One of the Army Training Camps "Somewhere in America:" Before the Blaze could be Extinguished Damage Amounting to About $40,000 was Worked

TOMMY IN THE QUAGMIRE OF "NO MAN'S LAND"

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HEREWITH is presented an artist's conception—based on actual observation and the stories treacherous mud of "No Man's Land," confronted by this invention of Teutonic "kultur," land between the first-line trenches becomes a sea of slimy, black mud that fills shell pits and the face of such conditions, progress is made at a rate of about a mile and a half an hour. The "flammenwerfer" in isolated streams from the Huns' trenches.

BATTLING MUD, RAIN, BULLETS, AND LIQUID FIRE

BY THE ILLUSTRATED LONDON NEWS

of participants—of an attack in the face of liquid fire. It shows Tommy Atkins, caught in the which the Allies, too, have been forced to adopt. When the rains come, the strip of wire-ensnarled other depressions so that they form horrible traps for unwary steps. If an advance is ordered in picture above shows how it is done in the fiendish yellow glare of the fire poured out by the

PICTORIAL WAR RECORDS OF RARE INTEREST

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Military Funeral of Two French Privates Who were Asphyxiated While Asleep in a New York Hotel: Both had been Wounded in Battle and Were Here to Help Train American Troops

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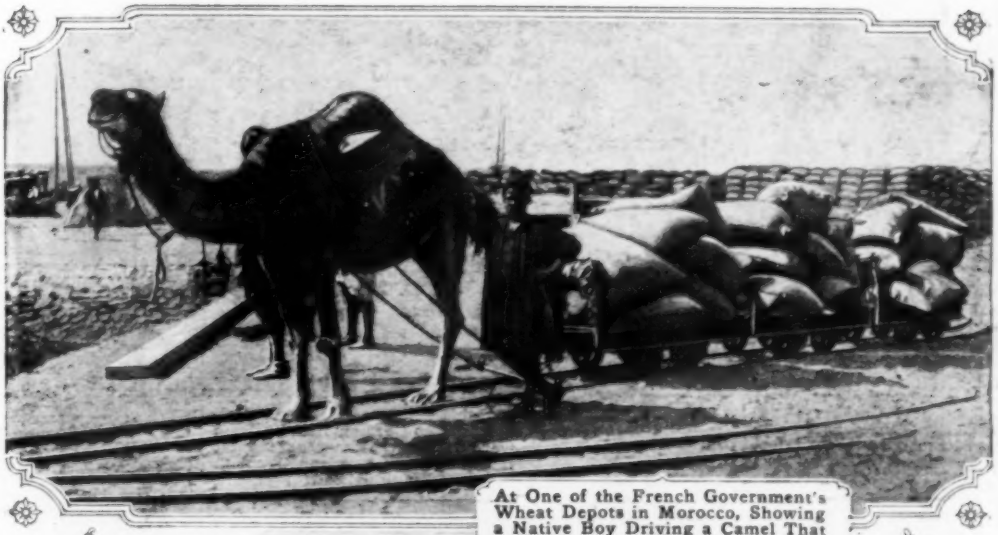
When a German Shell Burst Near By, This Big French Howitzer was Bowled Over as if It Were Nothing More than a Toy Cannon

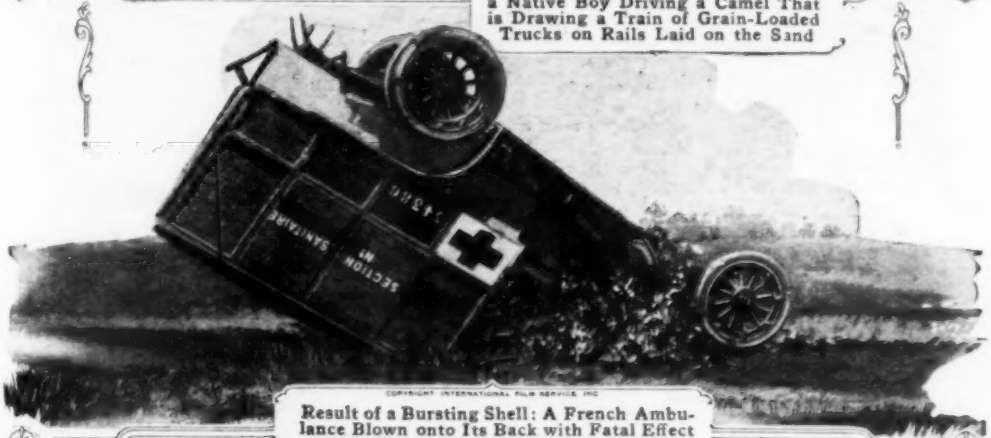
From the Expressions of the Soldiers at the Right, One Infers That the "Accolade" Is as Uncommon in Italy as in America. A French Colonel is Kissing an Italian after Presenting the Blue Ribbon

OFFICIAL ITALIAN PHOTO

COLLECTED FROM MANY PARTS OF THE WORLD



At One of the French Government's Wheat Depots in Morocco, Showing a Native Boy Driving a Camel That is Drawing a Train of Grain-Loaded Trucks on Rails Laid on the Sand



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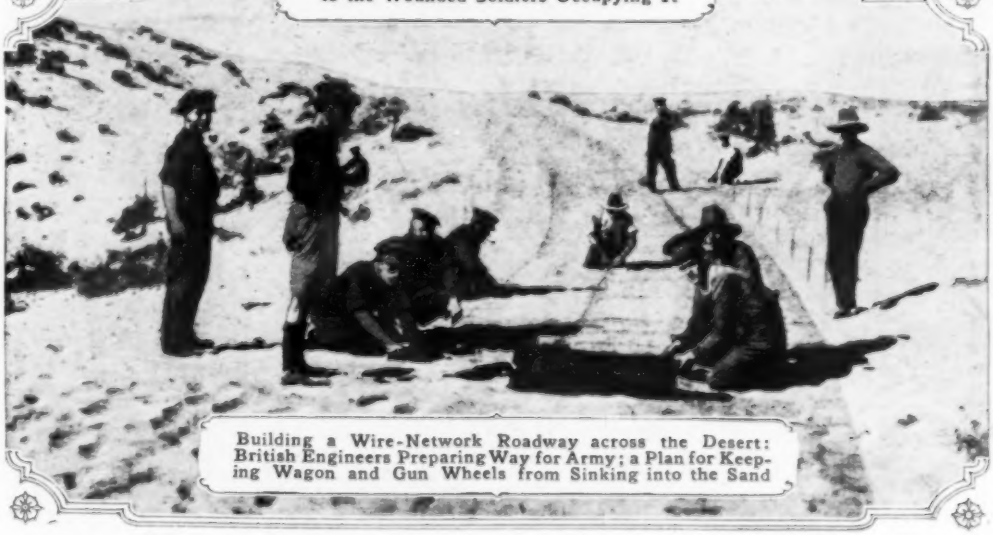
Result of a Bursting Shell: A French Ambulance Blown onto Its Back with Fatal Effect to the Wounded Soldiers Occupying It



Building a Wire-Network Roadway across the Desert: British Engineers Preparing Way for Army; a Plan for Keeping Wagon and Gun Wheels from Sinking into the Sand

SIDE LIGHTS ON WAR FROM TEUTONIC ANGLES

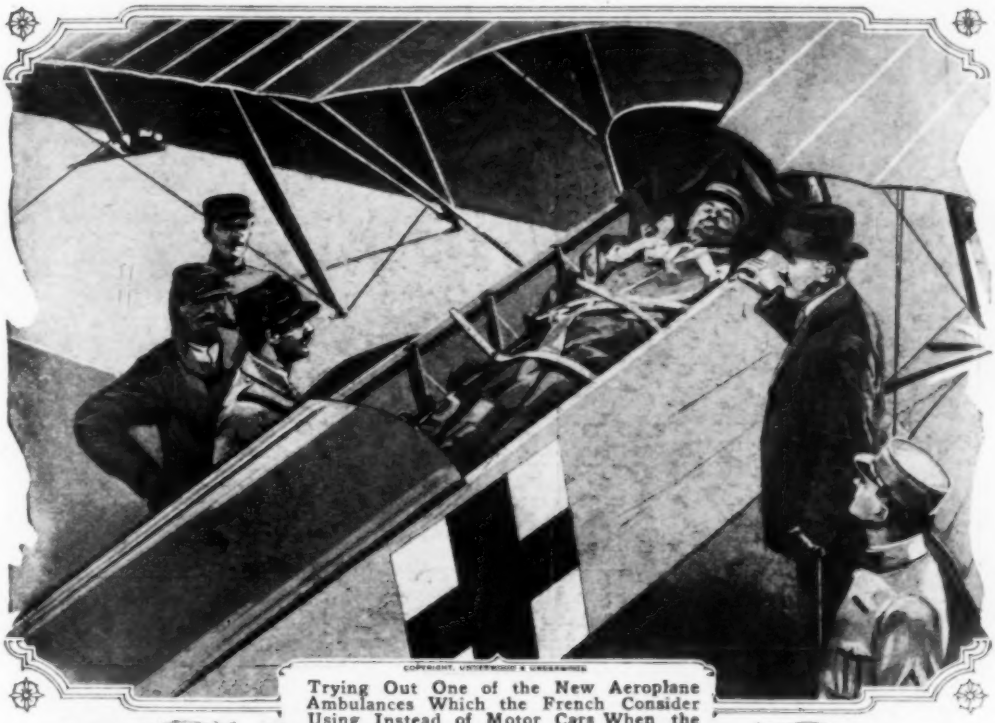
Skull Crusher Used by Austrians: Pear-Shaped Piece of Steel Fixed to Heavy Coil Spring

Marching between British Soldiers: Two German Airmen Who were Recently Recaptured after Escaping from a Prison Camp at Maidenhead

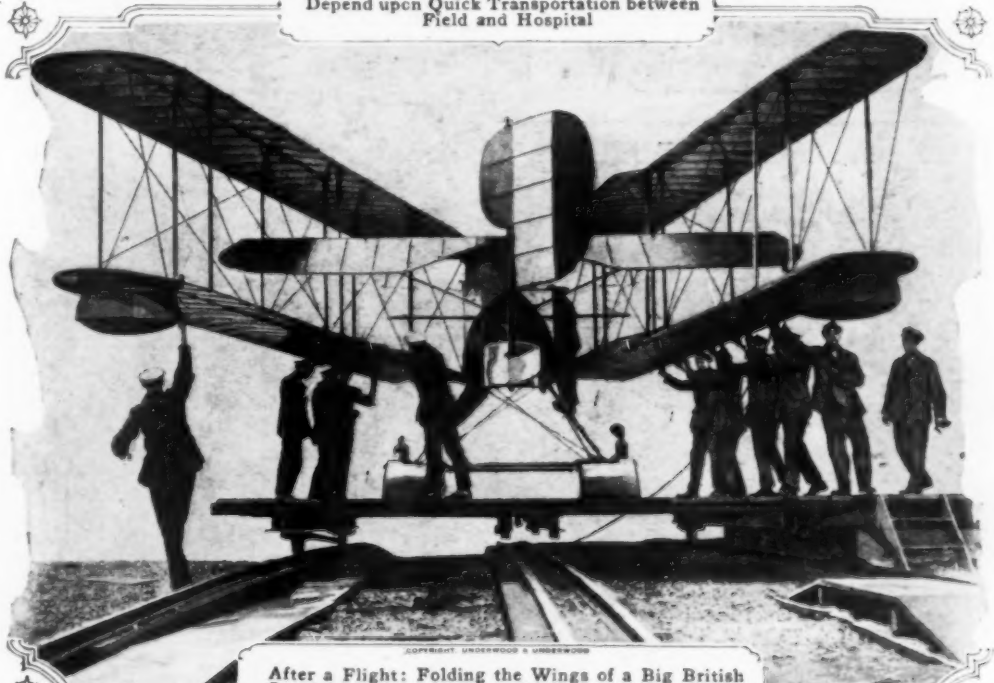
In Spite of German Successes in Belgium, France, Russia, the Balkans, and Italy, the Allies have Not been Losing Everything and Gaining Nothing. Above: Stamps of the German Colonies Taken by British

Reproduced Herewith Is a Photograph That was Taken from a German Soldier Captured on the Western Front. It Shows Teutons Tearing Down a Statue in a French Town Preparatory to Shipping It to be Melted

FRENCH AIR AMBULANCE AND BRITISH SEAPLANE

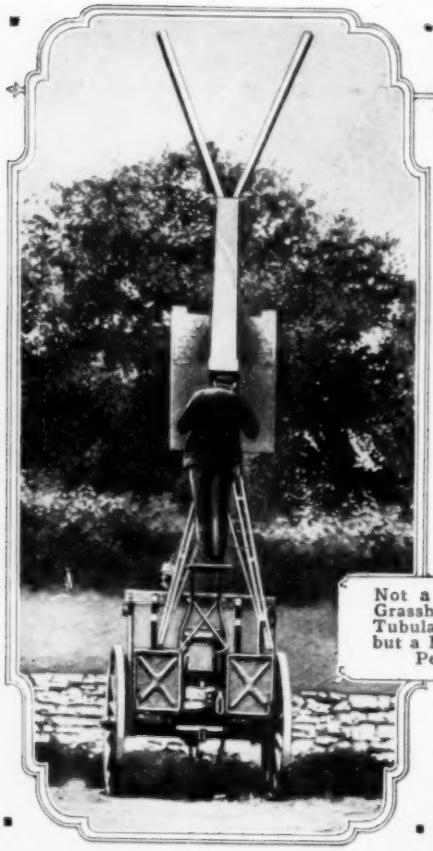


Trying Out One of the New Aeroplane Ambulances Which the French Consider Using Instead of Motor Cars When the Lives of Dangerously Wounded Soldiers Depend upon Quick Transportation between Field and Hospital



After a Flight: Folding the Wings of a Big British Seaplane before Pushing It to Its Berth in the Hangar. As Is Apparent, the Platform Truck Makes the Transfer from Hangar to Water a Simple Operation

INTERESTING PHASES OF AERIAL WARFARE



Not a Mechanical Grasshopper with Tubular Antennae, but a Mobile Field Periscope

Another of the Loud-Sounding Sirens Used When the Flying Huns are Sighted on Their Way Parisward

When the Signals Sound, if One Cannot Get Underground, the Next Best Thing Is to Lie on the Floor, as These English School Children are Doing

GLEANED AT RANDOM BY THE CAMERA MAN

Ruins of an Aeroplane Hangar near Boston, Probably the Work of a Spy: Investigators have Reached the Conclusion That the Structure was Bombed

Left: Close View of One of the Electric Sirens That Warns Paris of Approaching Air Raids

Right: What Sometimes Happens When a Shell Hits a Kite Balloon and the Parachute is Used

A Triple Trumpet Mounted on the Chimney of a Paris Building to Warn People on All Sides

WASHING MUD TWENTY FEET DEEP FROM WATER BASIN

In preparing river water for drinking purposes, according to the method used by a large city on the Missouri River, perhaps the phase of the work which holds the most interest for the layman is the manner in which the huge settling basins are cleaned. These reservoirs are built of concrete and cut stone, and the water is allowed to stand in them long enough to get rid of the soil which it holds in suspension. In one such basin, which is 25 ft. deep, mud to the depth of 20 ft. accumulates in the course of six months. Preparatory to cleaning the big tank, the water is drained off and with it as much of the soft mud as will discharge through the outlet. As soon as the sludge stops running, men in rubber suits go down to the bottom of the basin with hydraulic "guns" and play powerful streams of water on the foot of the mud bank. As the latter is undermined it mingles with the water and is carried off. Several days are required to clean the basin.

Using Hydraulic "Guns" to Wash Away a Layer of Mud 20 Feet Thick Which has Accumulated in a Waterworks Settling Basin in a Period of Six Months

LESSONS ON WAR PROBLEMS ISSUED BY GOVERNMENT

Important lessons which may be learned from the war, notably the value of food conservation and community coöperation, have been summarized in pamphlets that are being issued at Washington for use in the public schools. The Bureau of Education and the food administration are collaborating in this effort to help teach the rising generation practical phases of patriotism, and to give them an understanding of problems that will doubtless exist for many years after peace comes. The lessons are issued monthly and are divided into three parts, one for the upper high-school classes, another for the first-year high-school class and upper grades, and the third for fourth, fifth, and sixth grades.

AIR PROPELLER MAKES CAR FLAG HOLDER REVOLVE

The special feature of a new revolving flag holder for automobiles is that an air propeller, with which it is connected by gearing, supplies the driving power. Three sockets are provided in the holder in which flagstaffs may be inserted. The banners furnished with this outfit are attached to their staffs by metal clamps and are made of rubber composition, rendering them waterproof and more durable than silk or cotton flags.

ARE WE FACE TO FACE WITH A REVIVAL OF TRADE-MARK PROTECTION BY STATES?*

By FRANCIS H. WILLIAMS

Trade-Mark Specialist

WITHIN the last two years several corporation lawyers making a speciality of trade-mark practice have placed increasing importance on the subject of protection of trade-marks by filing individual state applications for the same in almost every state in the United States, in addition to seeking also the protection afforded under the Federal Trade-Mark Act.

Litigation concerning trade-marks is of unusual character in that there does not seem to have been any uniformity of decision under the Federal Trade Act, due to the fact, partly, that the circumstances of the different cases are not similar. Therefore the decision of the United States Supreme Court in the near future, in what is known as the "United Drug Company trade-mark case," is awaited with interest.

A few years ago, H. A. Jaynes was sued as agent of the United Drug Company by one Ellen M. Regis, who desired to prevent the use of the word "Rexall." The Regis woman had established the word "Rex" as a trade-mark under the state statute of Massachusetts of 1895, by filing her trade-mark in a proper application with the Secretary of State, in accordance with the laws of the commonwealth, on Sept. 27, 1898, and the registration was given the official number 673.

The validity of the trade-mark "Rex" and the title thereto of the said Regis, was twice adjudicated by the Supreme Court of the State of Massachusetts after strenuously contested and protracted litigation. In the last appeal, the Massachusetts Supreme Court sustained the contention of the lower courts that the word "Rexall" was an infringement of the word "Rex." Later, the United Drug Company paid $100,000 for an assignment of the rights of the Regis mark.

The word "Rexall" was a coined word, and it must be admitted that it was a good coined word. The United Drug Company, however, ran into a competitive mark, and it was the same word "Rex." An important contention of the United Drug Company in this suit was that the distinguishing characteristics of the trade-mark "Rexall" is the syllable "Rex," which equivalent abbreviation is also owned by the United Drug Company as a trade-mark.

It was found that Theodore Rectanus & Co. were doing business in Kentucky, and that they maintained the "Rex Medicine Company, Louisville, Ky., Sole Agents," who had placed on the market for a number of years several preparations under the trade name of "Rex." It was also contended that the concern was maintaining a "Rex store" without the consent of the drug company.

The demand of the United Drug Company was for an injunction, upon the proposition that they, having once acquired and perfected a trade-mark right in the United States Patent Office, and having continued and extended business thereunder, had established an indefeasible and exclusive right, that extended throughout all places subject to the laws of the United States and was to be enjoyed without interference from infringing users.

(The Hawaiian Islands, the Philippine Islands, and the Island of Porto Rico, all possessions of the United States and subject to the laws of the United States, have separate trade-mark laws, and so far as these possessions are concerned the United States trade-mark does not protect in those countries. This point may have been overlooked by many.)

In the complaint of the United Drug Company it is alleged that the trade-mark "Rex" was duly registered by its predecessor in the United States Patent Office in accordance with the statutes of the United States. The lower court in this case held that the contention of the United Drug Company was correct and said an injunction should issue. It later went to the United States Circuit Court of Appeals and as that court reversed the judgment of the lower court, the United Drug Company is now appealing to the United States Supreme Court. The appeal will be reached about January or February, 1918, in the United States Supreme Court, at Washington, and the court will be called upon to decide points that may enforce a very important revision of the views of those at the bar who have devoted themselves to the study of the specialty of trade-mark law. If the contention of the Circuit Court of Appeals is sustained, a doctrine is promulgated whereby state rights are sustained as against Federal trade rights.

It has been said that the present court decision would place a tremendous burden upon legitimate trade-mark users (referring to those who had secured their protection under the Federal act) and at the same time encourage infringement. I do not think this would be true, if the manufacturer adopts the method of protecting his mark under the various state statutes.

It is assumed to be the duty of every manufacturer to investigate every market in the United States to discover adverse use of his trade-mark. Why not avoid this, by first making a search in the United States Patent Office and in the office of every secretary of state, to ascertain if the mark intended to be used has been registered? With that done, one could surely go ahead

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with greater certainty. The cost probably would not exceed $50. It would be money well spent.

It must be remembered that all one can claim under the Federal act is an "interstate trade-mark." Surely all the incidents of a common-law mark are better perfected when the state application for the registration of a mark has been made to and the right issued by the Secretary of State.

Let us look at the further advantages. One can under the state statutes in almost every state make claim for associated articles; this is not always true of the Federal act. For example, to protect one's mark correctly, if he were a jobber of hardware, would require 82 separate applications under the Federal act. Under the state statutes it would require one application and specification to cover them all. In other words, there is no such thing as a division of classes of articles under the state situation. The fees, exclusive of attorney's fees, would amount to about $150; whereas, the amount of fees under the Federal act would exceed $820. There would probably be a greater cost in attorney's fees as well.

In this day, when foreign trade is becoming more and more important, there is no country that will not recognize the certificate of trade-mark issued by any Secretary of State. In fact, thoughtful attorneys today seek to procure this rather than the certified copy under the Federal act. This is in main due to the fact that a state application can be made as broad as ability can make it, and in foreign countries secures a better advantage. Then again attorneys know that they will not be bothered with some examiner raising some technical objection to the specification, which objection would be proper under the Federal act, but could be avoided in the state. It is agreed therefore that what is termed state protection, if one can afford an expenditure of, say, $500, affords more complete and ample protection than can be had under the Federal act.

While the state is able to give its sanction to a very broad application, so far as using the certified copy from the state is concerned, for use in a foreign country, great care should be exercised. For example, the words "Royal Worcester," the name of a well-known make of corsets, might be registrable in the United States and also in each of the states, yet, if it was decided to apply for a trade-mark on this name in England, on the strength of the application in this country, it would be refused. It has, in fact, been refused registration as a trade-mark in England. In a proceeding there, the words "Royal Worcester" were held "not adapted to distinguish the applicant's goods (corsets) from those of other persons and therefore were not distinctive words."

We frequently find on a package of goods the words "Registered in U. S. Patent Office." Most frequently, however, we find the abbreviation "Reg. U. S. Pat. Off." This latter expression is absolutely meaningless to the average layman. In view of the fact that I shall discuss this point from the standpoint of a state notice and its effect in foreign countries, I wish to add that this abbreviation in China might represent to some Chinese some new form or phrase of pigeon-English. Under a state trade-mark, one would use the words "Trade-Mark Registered." This phrase is used in substance by almost every country in the world having a trade-mark law. How much better would the phrase "Trade-Mark Registered in the United States Patent Office" appear. It is a well-known fact that trade-mark grades are fast supplementing bulk grades.

For example, again, the Federal act would prevent two or three associated labels from being registered in one application, yet it would be apparently registrable in the states.

To write the specification in a trade-mark application correctly is a study in itself, to which one should always give his best thought. If American manufacturers did this, they would often save themselves much trouble, particularly in foreign countries. For example, one leading manufacturer had a trade-mark on baking powder. He secured his Federal trade-mark and then secured a certified copy, and filed it, together with another application, in a foreign country. A few years later he found another manufacturer selling "baking soda" under an almost similar label and could do nothing. Had baking soda been also included in his specification, this would have been avoided. Very few, in any country, give to specification writing the necessary examination and thought. A very rare work on this subject gives some 143 main classifications with 143,000 or more subclassifications.

Then again, the registration in the United States Patent Office is limited to a 20-year period, after which it must be renewed. In most states it becomes a perpetual right.

Again, there is a mass of trade-mark litigation pending in the courts of the United States; this United Drug Company case, for example, having started in 1902. It takes many years for it to be reached in the United States Supreme Court, whereas decisions could be secured more quickly, and with less expense, under the state statutes.

It is true that an attorney must be an expert in the knowledge of trade-mark laws under state statutes, and that there are very few who have made a specialty of this practice, although there are many who are experts, and several in Federal trade-mark practice; still more attorneys would study these items if the clients demanded it. Anyone interested in this subject can secure additional information by writing to the secretary of their state and requesting the forms and laws upon the subject of trademarks. These can then be submitted to their attorneys for proper service and advice.

HEAVY LOSSES SUFFERED IN STOCKYARDS FIRE

FIRE of unknown origin recently swept through the Kansas City stockyards, destroying some 25 acres of pens. Approximately 7,500 cattle and 3,200 hogs perished, representing a loss of more than a million dollars. The flames spread so rapidly and burned with such intensity of heat that the animals could not be liberated fast enough to permit their escape.

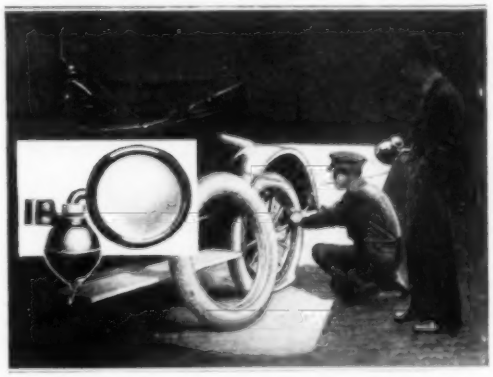
IMPORTANCE SEEN IN PLAN OF TESTING STEEL

Because the magnetic and mechanical properties of certain grades of steel are correlated, experts are explaining that the one may be used as a definite index to the other. The matter has attracted scientific interest and may prove to be of great industrial importance. Magnetic tests do not injure steel and therefore may be applied to raw or finished material that is actually to be used. This would obviate the practice of subjecting mere samples to mechanical, chemical, and microscopic examination and would supply positive knowledge instead of hypothetical information, it is contended. In preparing for such tests it is necessary to collect magnetic data of satisfactory, inferior, and "indifferent" samples and then formulate a chart of equivalence between these data and the qualities to be estimated in the material.

¶Shark meat has recently been included in banquet menus in the East and has been pronounced very palatable.

AUTO LAMP HAS EXTENSION CORD ON SPRING ROLLER

In a new type of combined trouble lamp and searchlight for automobiles, a spring roller is provided on which the extension cord attached to the lamp is wound automatically. The roller is concealed in a spherical metal case mounted adjacent to the bracket. Unscrewing a knurled nut detaches the lamp, permitting its withdrawal the full length of the cord.



An Auto Searchlight, with an Extension Cord, Employed as a Trouble Lamp: Insert Shows Lamp and Spherical Cord Case, in Detail

"GUN" USED TO BAND TREES WITH MOTH REPELLANT

To facilitate the work of fighting the gypsy moth by banding trees with a preparation formulated by the Bureau

Using the Special Grease "Gun" with Which Trees are Banded Quickly and Neatly: Insert Gives a Striking Illustration of How the Sticky Band Prevents the Caterpillars from Reaching the Foliage of a Tree

of Entomology, a cylindrical grease "gun" has been devised. With the instrument, operated by scissor levers, the sticky substance that prevents the ravenous caterpillars from reaching the foliage by ascending the trunk of a tree, is quickly applied. The necessity of this work, incidentally, is yearly growing more urgent in certain sections of the country.

PAPER WITH HUED EDGES FOR OFFICE FILING

Inconvenience due to the present shortage of colored paper and cards, such as are used in office files, may be obviated by use of white paper and cards having bands of the desired color printed next to the top and bottom edges. A firm putting out stock of this sort agrees to match any tints formerly used.

SEAMEN USE CONCRETE BOAT ON LAKE MICHIGAN

As evidence of the practicability of reinforced-concrete construction of small motorboats, a craft of such character is in daily use on Lake Michigan at Chicago by the naval reserve. It is 18½ ft. long, 4½ ft. beam, and is driven at a speed of about 10 miles an hour by a 6-hp. motor.

A T-bar was used for a keel and flat steel strips were riveted to it at 12-in. intervals to form the ribs. Similar strips were extended longitudinally, and over the framework thus formed wire mesh was stretched and concrete applied. Below the water line the mesh was placed on both sides of the skeleton to give additional strength.

Although the boat is the pioneer effort of its builder, it has been found thoroughly seaworthy and there has been no trouble with leaks, or otherwise.

Reinforced-Concrete Motorboat within the Breakwater in Lake Michigan at Chicago

FEEDING A ZOO IN WAR TIME

Bird, Mammal, and Reptile, Each must Have His Favorite Dainty

By WM. D. GOODWIN

THERE is no more extensive menagerie in the world than the New York Zoölogical Park which comprises 360 acres of land and water. There are to be found 5,000 specimens of birds, mammals, and reptiles on exhibition in comfortable buildings, yards, dens, and cages.

This valuable collection has been gathered from many parts of the world, and a number of the exhibits are considered priceless.

The aquatic family of birds, during the summer months, occupy a cage 55 ft. high, 75 ft. wide, and 150 ft. long, made of steel pipe and wire netting, several trees and plenty of water being within the inclosure. Here the birds may fly, build nests, rear their young, and enjoy real open-air freedom.

No place in the park affords more entertainment to visitors than the pool of sea lions, near the main entrance. Their graceful diving, swimming, and other frolics are always enjoyed by visitors. The occupants of this pool, the birds in the flying cage, and the bears in their open sunlit yards, with bathing pools and cosy sleeping dens, all appear to vie with one another in their efforts to be amusing, happy, and contented. It may be said of all this collection, judged by their spirit of playfulness, and their finely developed bodies and general contentment, that captivity has been robbed of its former terrors.

This Businesslike Place Is Not a Grocery but the Room in Which Foods for a Great Number of Creatures in the New York Zoo are Cooked or Otherwise Prepared

With few exceptions, this large family is fed once a day. To provide food for such a hungry army, with such differing tastes, is a problem. Especially is this true under present conditions, for the war has brought a change in the diet of some of the animals in the zoo. Their daily bill of fare may be said to extend from "A" to "Z" as the list of supplies distributed by the cook begins with apples and ends with zwieback. Last year ten acres of land were under cultivation for raising vegetables, and other products, to satisfy, in part at least, the appetites of the vegetarian and carnivorous creatures; and there are many items forming their menu which cannot be produced on the farm adjoining the zoo, such as raisins, figs, bananas, beef, fish, clams, nuts, dates, cocoa, pineapples, sugar, and rice.

Great care is exercised in the selection and preparation of all foods and to the efforts of the cook and the veterinary, working under hygienic conditions, must be given due credit for the health of their large family. A number of food products regularly on the bill of fare have been practically eliminated on account of their excessive cost, such as cabbage, lettuce heads, and potatoes.

A detailed list of the foods consumed in a year by these boarders would be a long one, but mention may be made of some of the products used. Fifty

bushels of apples, 580 bunches of bananas, 80 pineapples, 30 pounds of raisins, 20 boxes of oranges, 280 pounds of grapes, 40 dozen peaches, 110 dozen pears, are the delicacies relished by rodents, monkeys, and birds, 30 watermelons being enjoyed by the tortoises. The best hay obtainable forms the staff of life for the hoofed animals, being consumed in large quantities. "Alice," the most gentle elephant, seems to relish one bale of hay a day and several loaves of bread as dessert. To the hay must be added 110 tons of alfalfa, 140 tons clover, and 250 tons of timothy, and 20 tons of straw are used for bedding.

A Sea Lion Eating a Meal of Fish—a Food He Insists on Having, Regardless of Cost

The pelicans, herons, sea lions, and some of the fur-bearing animals consume large quantities of fish, an aggregate of 48,000 pounds, large and small and of various kinds, being required. Of this quantity 28,000 pounds are dead fish. Certain reptiles consume 1,600 live frogs, sharing them with the beavers, martens, and weasels.

The high price of beef has driven the management to substitute horseflesh to some extent. While the lions eat the latter, it is with less relish than the regular diet of beef. The item of meat is a large one, 105,000 pounds being used and 500 pounds of meat scraps. Much of the meat is cooked, the scraps being ground for the birds. From 60 to 100 horses are slaughtered, and more will be used if the price of beef continues to advance. Care is exercised, however, in selecting horses for food purposes, and they are closely inspected by the veterinary in advance of acceptance for consumption.

There are delicate appetites which must be satisfied among the boarders. The small birds require 100 pounds of dried flies and 10 pounds of mosquitoes. Certain other birds, and the lizards, thrive on 240,000 meal worms, 4,000 pounds of middlings, 1,000 pounds of rapeseed, and 100 pounds of poppy seed. Seeds selling for four cents a pound in normal times now cost $1 a pound. Zwieback, ground and mixed with other

Ordering His Dinner with Emphasis: Now It Often Is Horse Meat

White Pelicans, Close Rivals of Sea Lions as Eaters of Fish

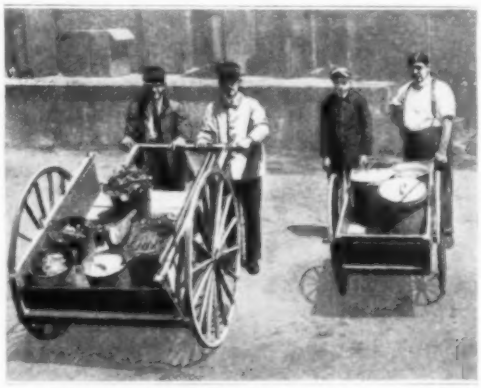
The Operating Room Where Afflicted Small Animals are Taken Care of in a Thoroughly Scientific Manner

At the Left Is a View in the Carpenter and Machine Shop Where the Animal Cages of Wood and Wire are Made

The Mill for Grinding the Animals' Foods, Bags of Grain, and Handy Trucks for Moving the Same are Shown at the Right

things, is fed to humming birds, 7,000 pounds of this product being used. Grains form a substantial part of the diet for birds; 3,500 pounds of wheat, 140 pounds of whitebait, 130 pounds of ants' eggs, 10 pounds cuttle bone, 1,000 pounds of Kaffir corn, 1,000 pounds hempseed, 2,000 pounds grass seed, 360 pounds of rice, and other seeds in lesser quantities are mostly consumed by the feathered tribe.

Stale bread to the extent of 67,000 pounds is used by the elephants, bears, and hoofed stock. The small animals consume 40 cases of condensed milk, some of it being mixed with eggs. The condensed milk is considered safer than fresh milk on account of the risk of tubercular infection. There are, however, 560 quarts of fresh milk used after it has been brought to the boiling point. About 1,300 dozen eggs are distributed among birds, reptiles, and small animals. The opossum and armadillo enjoy eggs and meat mixed together. Canned salmon contains large quantities of lime and phosphates, especially the bone of that fish, and this is fed to monkeys having weak spines.



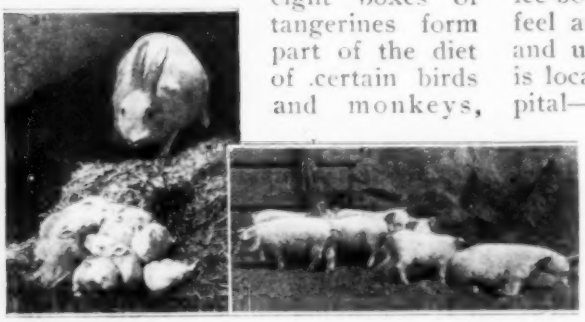
Good-Sized Meals for Somebody: These Carts Contain Pails of Cooked Potatoes, Raw and Cooked Meats, Fish, Bread, Lettuce, and Carrots

The mammals require 1,940 pounds of lump salt, 950 pounds of table salt being used for seasoning cooked foods. Rats, and other rodents, are fed 1,410 pounds of roasted peanuts, and the squirrels consume 230 pounds of hickory nuts. Oats to the amount of 10,000 bushels, 3,000 pounds of barley, and 5,300 bushels of shelled corn are divided between the birds and stock.

Small members of the cat family, and certain reptiles, are supplied with pigeons, while other reptiles take pigs and guinea pigs, leaving 5,000 rats and 120 toads for certain others of this family. About 1,800 mice and 700 white rats are distributed between the owls, hawks, and other carnivorous small animals. Four tons of cabbage mixed with grains are fed to the hoofed animals in normal times. Carrots to the extent of 90 barrels, 20 quarts of onions, 300 barrels of potatoes, 40

Among the 5,000 Creatures on Exhibition in the New York Zoo, This Fine Herd of Buffalo is Especially Prized. These Roving Animals Are Particularly Fortunate in Having So Spacious a Grazing Area. The Food They Obtain Here is Supplemented by Tons of Hay

dozen lettuce heads, and 80 barrels of lettuce leaves are used. Ten boxes of strawberries, 12 boxes of oranges, eight boxes of tangerines form part of the diet of certain birds and monkeys,



These Tiny Creatures are Not Raised for Exhibition Purposes but to Supply Food for Certain Animals

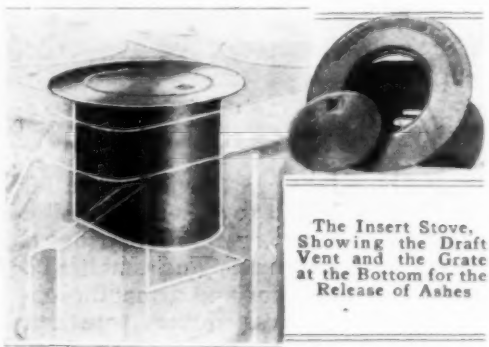
5,000 ears of corn on the cob going to the rodents and beavers.

In addition to the vegetables raised on the farm, there are 2,000 chickens and a good supply of eggs, mice, rats, rabbits, and guinea pigs which find their way to the zoo.

The kitchen is equipped with ranges, hot-water supply, kettles, pots, pans, tables, meat blocks, double boilers, and ice-box; in fact, any hotel chef would feel at home with such an extensive and useful outfit. A slaughter house is located in the park, and also a hospital—the finest of its kind—provided with wards for animals which must be quarantined, an operating room, accommodations for nurses on night duty, a research room, and a morgue. Disbursements for salaries of officers and keepers, curators, and the upkeep of the grounds and buildings, amount to $200,000 a year. Several restaurants and the income from the rental of boats are sources of revenue. A community store is operated for the benefit of employes, of whom there is a large number. The profits of the store are divided between them at the end of the year.

TINY INSERT STOVE SAVES FUEL

A tiny cast and sheet-steel burner, which is inserted into a cooking range for use when only a small fire is needed, makes light cooking possible with a minimum consumption of fuel. The insert stove fits into any standard stove hole. It burns coal, wood, or trash. The opening in the side at the top serves as a flue and the grate at the bottom releases the ashes.



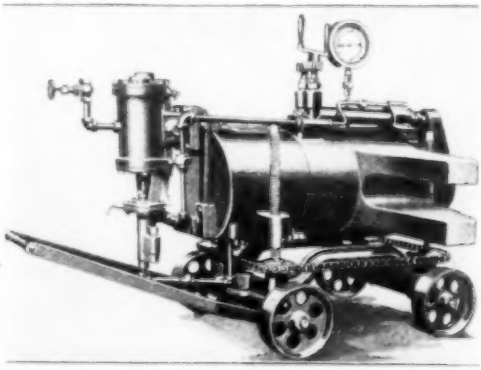
The Insert Stove, Showing the Draft Vent and the Grate at the Bottom for the Release of Ashes

RECIPROCATING MACHINERY ELIMINATED IN SHIP

A tank steamer whose engine room presents the distinct novelty of having no reciprocating machinery of any sort is now being built. The propelling machinery consists of a low and high-pressure turbine geared to a single propeller. A surface condenser provided with a centrifugal pump is driven by a turbine. There are two centrifugal hot-well pumps and these also are turbine-driven. A rotary oil pump supplying lubricants for the turbine and gears is driven from the main gears. This is the first ship in which rotary machinery is to be used throughout. It is believed by engineers to mark an epoch in shipbuilding history.

POWERFUL PORTABLE PRESS FOR RAILWAY SHOPS

For forcing crank pins into locomotive wheels and for miscellaneous shop work of similar character, a portable press capable of exerting a maximum pressure of 300 tons is carried on adjusting screws mounted on a flat-wheel truck. The pump is driven by an air engine, connected to the shop air main by flexible tubing, and replaces the usual hand equipment. Pressure required to set a pin is accurately measured by a gauge, and in this way a loose fit, that might prove disastrous, is readily detected.



The Pump Engine is Connected with the Shop Air Main by Flexible Tubing the Same as Any Pneumatic Tool

PALM BASES DISPLAY NATIONAL COLORS

A patriotic citizen in a southern city has decorated the palms in front of his home with the national colors. The boles were scraped perfectly smooth and the colors applied with paint. The decoration is strikingly conspicuous, and also gives the palms the appearance of potted plants.

Palms with Bases Painted in the National Colors

BOYS DAMAGE VAST NUMBER OF STREET LIGHTS

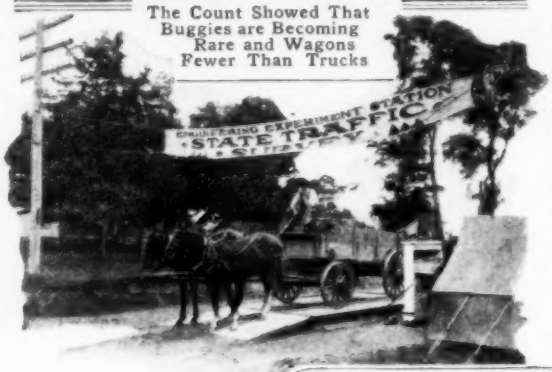
Officials of Chicago have appealed to the school principals of the city, the Boy Scouts, and others, to aid in stopping the wanton destruction of street-lamp globes and bulbs by reckless boys, which is now going on to such an extent that it costs $30,000 a year to replace broken fixtures. It is pointed out that this sum would be sufficient to maintain 8,000 lamps. The unusual amount of damage which was done on the recent Halloween brought the matter forcibly to the notice of the authorities and they propose to check the evil at once.

TRAFFIC-CENSUS TAKERS WEIGH ALL VEHICLES

For perhaps the first time in the history of this country what might be called an accurate "diary of a highway" has been written, the data for this record having been secured by takers of a traffic census representing the engineering department of Iowa State College and the Iowa State Highway Commission. This investigation took place on important roads in various parts of Iowa, and at some of the census stations scales were set up right in the roadway, on which every passing vehicle was weighed. The purpose was to secure accurate data as to the number of vehicles using the roads, the amount of traffic between farms and markets, the amount of traffic between two urban points (called interurban and tourist traffic), the relative proportions of motor and horse-drawn vehicles, the character of tires used, and the actual tonnage carried over the roads.

Scales Set Up on an Iowa Highway for the Purpose of Weighing Every Vehicle That Passed

The Count Showed That Buggies are Becoming Rare and Wagons Fewer Than Trucks

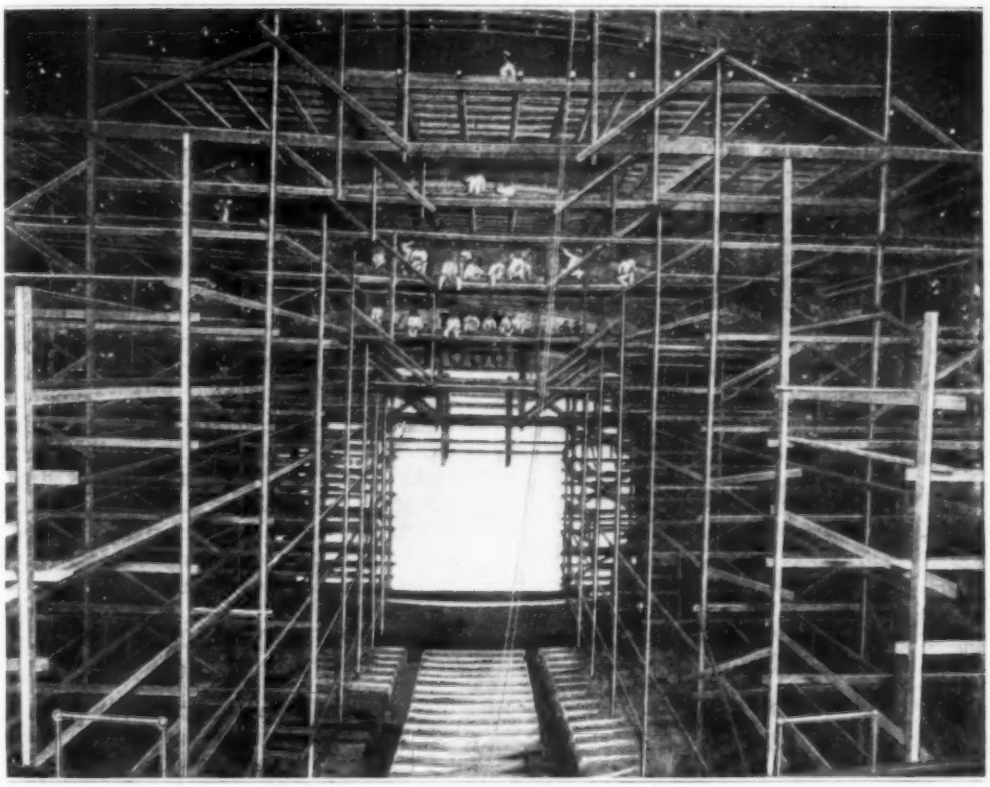


About 16 Tons of Traffic Passed over One of These Scales Hourly, the Pleasure Autos Far Outnumbering All Other Vehicles

Approximately 33,000 lb. per hour, or 500,000 lb. of traffic for a 15-hour day, passed over one of the roads. The early part of the census, as taken at eight different stations, demonstrated that in the neighborhood of 76 per cent of all vehicles counted were traveling from town to town, showing how much greater this type of traffic is than that going to and from farms. While recognizing that at certain seasons farm traffic would be heavier than the census showed, and town-to-town traffic lighter, nevertheless these figures are taken by many to indicate that Iowa's towns and cities are not paying their share of the state's road and bridge-building bill.

Eight stations, on as many roads, for an aggregate of 59 days'

While Weighing Each Vehicle the Census Takers Also Ascertained Its Destination and Other Important Data



Enormous Scaffolding Used by Decorators in Reaching the Ceiling of the Auditorium Theater, Chicago, at Heights from 50 to 110 Feet: Neither Saw Nor Hammer was Used in Erecting the Elaborate Falsework

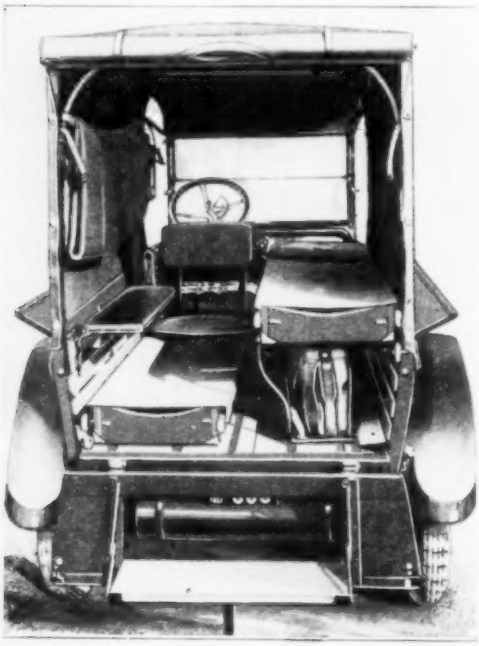
counting, showed a total of 1,853 horse-drawn vehicles as compared with 20,616 motor vehicles. The count also shows a few more motor trucks than horse freight vehicles. Another fact indicating that horses are being almost entirely supplanted by powered vehicles is that there was a total of 1,053 carriages, surreys, buggies, etc., as against 19,706 motor cars of the passenger type. The number of bicycles and motorcycles counted was exactly the same, namely 145.

GREAT INTERIOR STAGING BUILT IN CONCERT HALL

Redecoration of the interior of the Auditorium at Chicago, preparatory for the grand-opera season, recently necessitated the erection of an elaborate scaffolding of surprising proportions. More than 100,000 ft. of lumber was used in building a 12-story framework, 200 ft. long and 100 ft. wide. The structure was established and subsequently disassembled without the use of a saw or a hammer. Four-inch timbers 16 ft. in length, with holes bored at right angles 12 in. apart, and bolted end to end between steel plates, formed the uprights. All the ledgers, lookouts, and braces were similarly perforated and secured. The falsework was strongly trussed so as to span a 40-ft. space left unencumbered by uprights in the middle part of the floor. This arrangement permitted a small part of the house to be used for church services and entertainments while the work was in progress. The redecorating was the first to be done since the building was erected 28 years ago. The $90,000 worth of gold leaf covering the plastic adornments and architectural projections was cleaned and restored.

NEW AMBULANCE MAY BE USED AS MOTOR TRUCK

An ambulance quickly convertible into a motor truck for ordinary hauling purposes has been developed for



Interior View of the Convertible Ambulance and Motor Truck: The Equipment is Carried on the Outside When Used as a Truck. The Attendant's Seat Folds Up

use in war or by civilian hospitals. The ambulance equipment is readily removable and is carried on the outside when the vehicle is used as a truck. Electric lights provide illumination both inside and out. A complete first-aid outfit is carried.

AMERICAN WOMAN STARTS CAFETERIA IN LONDON

An enterprising American woman, who has been honored with a government position in London in connection with the control of food, has introduced the cafeteria to East End residents in that city. After studying methods employed in large cafeterias and other eating houses in Chicago and New York, she drew up plans for a self-service eating place which could feed 1,500 persons at once and convinced the British authorities that it would prove more economical to operate than an English type of establishment. In some respects American methods were not duplicated, however, for provision had to be made for a large number of patrons who desired to purchase food and take it home to eat.

Supplementing this cafeteria, and operating with it as a base of supply, are "food barrows"—vehicles whose merits America might well consider. They are substantially made two-wheel carts containing hot-water reservoirs in which deep food pots are set. Though the barrows weigh some 300 pounds, girls push them about, selling hot food at the doors of the poorer homes for a few pennies per family. By following the same schedules daily they enable many mothers to rely on the barrows almost entirely in preparing meals.

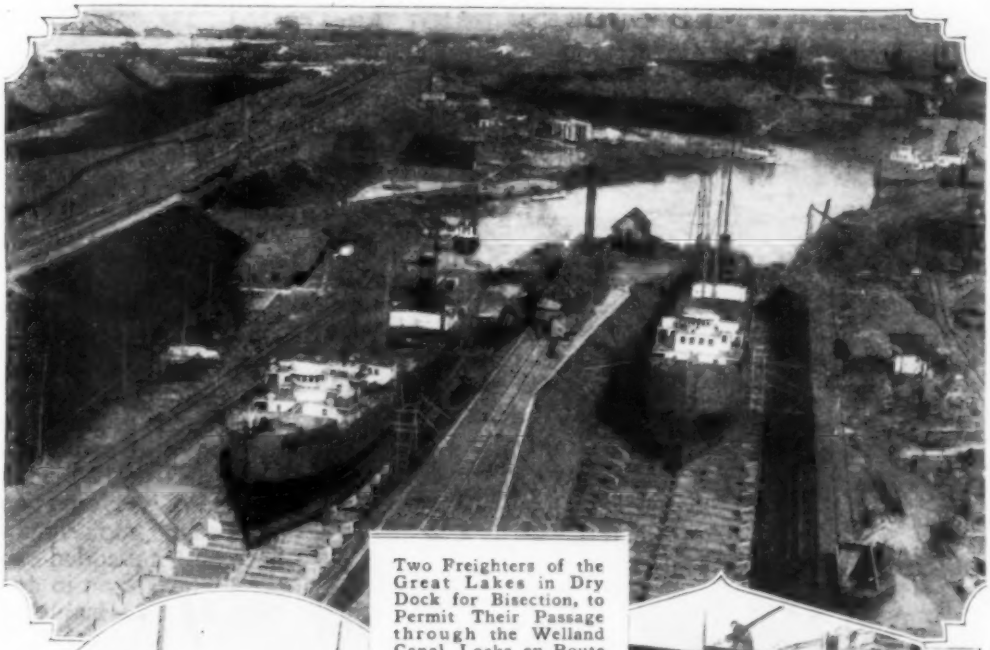
MINIATURE VIOLIN HIDDEN INSIDE OF CANE

For the modern Romeo and his midnight serenades, a walking-stick violin might have certain advantages. At any rate such a combination instrument has been fashioned. The cane is made of bamboo and by removing a well-fitted section the strings are uncovered.

To All Outward Appearances the Instrument Is an Ordinary Bamboo Cane of Generous Diameter. It Takes Only a Minute to Withdraw the Bow and Uncover the Strings

The bow is withdrawn through one end of the stick. It is said that the tone is creditable.

MANY LAKE VESSELS BISECTED FOR CANAL TRIP



Two Freighters of the Great Lakes in Dry Dock for Bisection, to Permit Their Passage through the Welland Canal Locks en Route to the Atlantic Seaboard

The "North Wind" Cut in Two: Ships More than 270 Feet Long cannot Pass from the Lakes to the Ocean Intact

So Great has Been the Demand for Bottoms That Many Lake Vessels have Undergone the Operation That is Here Shown in Progress

The Open Ends of a Bisected Boat are Fitted with Wooden Bulkheads as Pictured Above. At Montreal Temporary Repairs are Made. The United States and Canadian Governments are Considering Lengthening the Welland Locks

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DOUBLE ARCH AND GODDESS ADVERTISE WAR LOAN

Noteworthy among the devices employed in various parts of the country to advertise the second Liberty loan was an outdoor decoration consisting of two intersecting white arches, erected at a prominent street crossing in Cedar Rapids, Ia. The curved spans sprang from the four street corners and met overhead, forming a support for a goddess of Liberty which stood 20 ft. high.

Arches, Supporting a 20-Foot Statue of the Goddess of Liberty, Which Did Much to Advertise the Liberty Loan in Cedar Rapids, Iowa

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¶Over 3,600,000 trees, supplied at cost by the state, have been planted on the waterworks drainage areas of 21 municipally owned, and seven privately owned, waterworks plants in New York State within the last nine years.

NEW MATERIAL TO PROTECT BRIDGES OVER RAILWAYS

A protection, consisting of a special kind of plastic cement for the under side of bridge floors, against the blasts and gases issuing from locomotives passing beneath the structures is being tested by the Santa Fe Railway. The cement is applied to a strip of the bridge just above the center of the track and is not affected by the heat from engines passing beneath, it is said. The cinders from the smokestacks become imbedded in the material and in due time it is advisable to add another coat. In case the cement is cut, or torn, the breach will be healed automatically by the gradual flow of the plastic material.

WATER ROUTE IS CHEAPEST FOR MOVING AN OFFICE

A Louisiana concern engaged in a large drainage project, recently saved approximately $3,000 by moving a small frame office building and a shed 32 miles by water, instead of erecting new structures or moving the old ones by land. Both the old and the new sites were not far from the water, and a house mover was employed to transfer the structures to and from a large

To Avoid Building New Structures a Louisiana Concern Moved an Office Building and a Shed 32 Miles on a River Barge, as Shown Here, Thereby Effecting a Saving of Approximately $3,000

barge, drawn by a river steamboat. The entire journey, including the water trip which occupied two hours, was made without disturbing the contents of the office.

RED LIGHTS SIGNAL CAR'S STOPS AND TURNS

A new automobile signal which is easy to install and operate consists of two diamond-shaped red lamps mounted at the rear of a car and controlled by a lever fastened to the steering column. The lamps are made so that they do not show red except when lighted, thereby avoiding any possible confusion. When a driver is about to turn he moves the switch lever in the direction of the turn, causing the lamp on that side to be illuminated. When the car is about to stop both lamps are lighted at once, by pointing the lever upward.

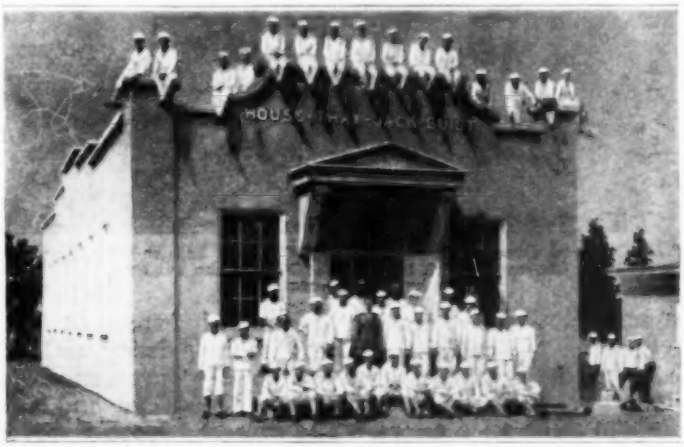
Diamond-Shaped Rear Lights Used to Indicate the Car's Stops and Turns: The Controlling Switch beneath the Steering Wheel is Shown in the Insert

USE DYNAMITE TO IMPROVE DRAINAGE OF ROADS

The highway department of the state of Missouri has recently recommended the use of dynamite in certain cases where the drainage of roads needs improving. It is pointed out that the dumping of stone into a mudhole generally does little more than spread the water out over a larger area, and that what should be done is to provide means for getting rid of the excess moisture. Very frequently a bed of clay forms a pocket beneath a muddy spot in a highway, and if this can be broken through, the water accumulated above it will quickly flow down into gravel beneath. In such cases the exploding of a charge of dynamite, at the proper depth, will cause the necessary fissure, or pathway, to be formed, and the mudhole will disappear. The hole made by the dynamite should be filled with coarse material.

HOME FOR Y. M. C. A. BUILT BY GRATEFUL "JACKIES"

"Jackies" at the naval training station at Newport News, Va., recently proved their high regard for the work of the Y. M. C. A. by erecting a building for that organization with their own hands and paying for the material from their own pockets. The new structure was built to take the place of one recently burned, and is fittingly called, "House That Jack Built."



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New Y. M. C. A. Headquarters at Naval Training Station at Newport News, Virginia, and a Picturesque Array of "Jackies" Who Helped Build and Pay for It

The Picture at the Left Shows the Gasoline Car and Freight Locomotive after Their Destruction. At the Right the Freight Locomotive is Shown as It Appeared after Cooling Enough to Permit This Picture to Be Taken

TORNADO OF FIRE FOLLOWS RAILROAD ACCIDENT

Caught in a sea of fire when his locomotive collided with a tank car of gasoline a fireman on a western railroad was burned to death as he jumped to escape the collision. The gasoline car was being pushed by a switch engine and crashed, head on, into the freight train on a curve. The impact overturned the fuel car, spilling its contents which ignited, cremating the fireman and destroying both of the locomotives.

The Collision Overturned the Gasoline Car, Spilling and Igniting the Contents Which in Turn Set Fire to the Oil Fuel Tanks of the Locomotives

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¶The government has doubtless placed the biggest lumber order on record by recently contracting for 375,000,000 ft. and later 400,000,000 ft. of Southern pine.

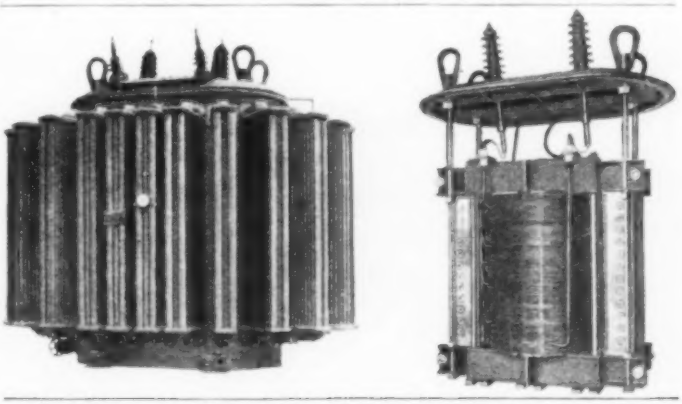
BOWLING-PIT MATS MADE FROM WASTE PRODUCT

In producing a new kind of pit mat for bowling alleys, profitable use is being made of a certain form of waste which is incident to the making of automobile tires. One of the steps in the manufacture of the latter is to bake the tires, after wrapping them in strips of thin, firm canvas. These wrappings must be discarded when the slightest imperfections appear and so accumulate rapidly, as refuse, in tire factories. Though they might be classified as rags, they are of little value to paper-board makers, and, being impregnated with rubber, are unfit for paper making. But resiliency and toughness are required in protections for the pits of bowling alleys and when these wrappings are loosely woven into mats for this purpose they prove very durable.

IMMENSE TRANSFORMERS RESEMBLE RADIATORS

Six self-cooled transformers, said to be among the largest ever made, have recently been completed for a steel company, which are rated at 8,000 kilovolt-amperes each and step down the

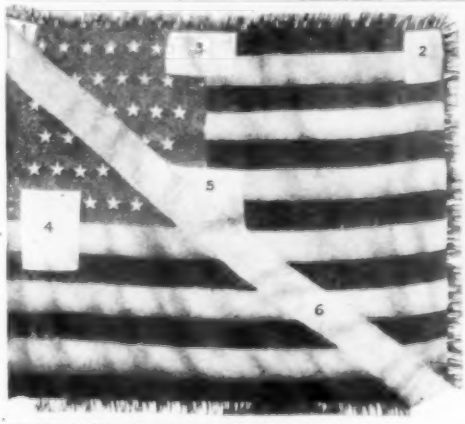
voltage from 44,000 volts to 6,600 volts. The transformers are of the single-phase, 25-cycle type. Outwardly they resemble large circular radiators, since 24 radiators, through which the oil flows automatically, are grouped around the central tank, giving a cooling surface far in excess of what many had supposed possible. These radiator units consist of vertical, flattened tubes, rigidly welded into headers which are flanged so that they can be bolted to the tanks. An entire absence of screwed pipe fittings assures oil-tight joints.



Left: One of Six Self-Cooled Transformers, Recently Built, Which are Rated at 8,000 Kilovolt-Amperes and are Each Provided with 24 Radiators through Which the Oil Passes Automatically. Right: View of the High-Voltage Side of One of the Transformers Removed from Its Tank

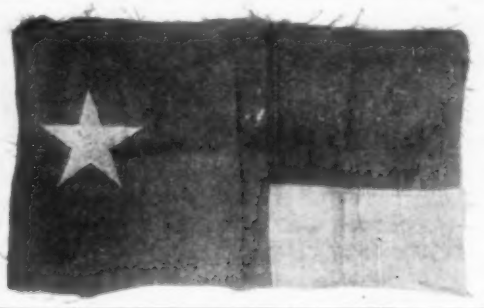
PIECE OF PEARY'S FLAG FOUND IN NORTHLAND

Among the mementos of special historic interest to Americans, which members of the Crocker Land expedition have brought back from the frozen North and recently placed on exhibition in the American Museum of Natural History, New York, is a piece of an American flag—a little rectangle of red, white, and blue silk deposited at Cape Thomas Hubbard by Admiral Peary while on the famous expedition which resulted in his reaching the North Pole. The emblem from which this piece was taken is now in Washington, D. C., minus portions that were removed and cached at various points on the journey northward. At the pole itself, Peary left a long piece cut diagonally from the standard. It is not difficult to imagine the thrill experienced by the leader of the Crocker Land expedition when he came upon a portion of our national ensign.



COPYRIGHT, ROBERT E. PEARY AND BENJ. B. HAMPTON

The Flag, Now in Washington, from Which was Cut the Portion Recently Brought Back: The White Spaces Indicate Pieces Cut Out and Left at Various Northern Points



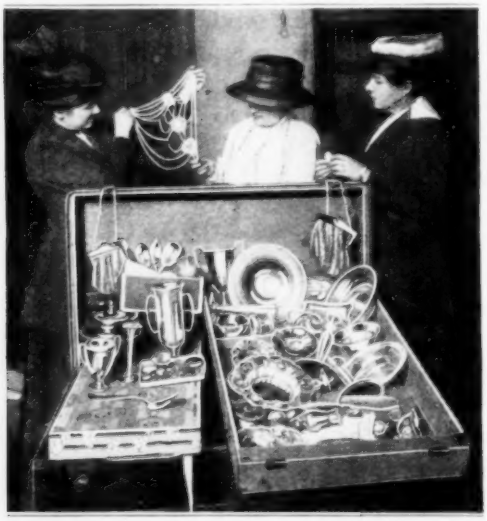
COURTESY OF AMERICAN MUSEUM OF NATURAL HISTORY

The Portion of the Flag Which the Leader of the Crocker Land Expedition Found at Cape Thomas Hubbard, Where Admiral Peary Deposited It on His Way to the North Pole

The flag is handsomely embroidered and was the work of Admiral Peary's wife.

AID WAR FUND BY MELTING UP PRIZED SILVERWARE

Trunkloads of silver bread trays, candlesticks, spoons, mesh bags, vases,



A Trunkful of Silverware, Donated by Patriotic Cincinnati Women, to be Melted Up and Sold for the Benefit of the Soldiers

and similar articles, many of them long-cherished heirlooms, are included in the remarkable collection of precious-metal ware that the women of Cincinnati have given to what is called a "thimble fund." The articles are melted up and the metal donated to funds to aid the soldiers.

SPRAY FAMOUS OAK ROOF TO KILL WOODWORMS

The most effective measures known to science have been taken to exterminate the woodworms which are found to have very seriously damaged the massive roof timbering of oak in old Westminster Hall, London. A spray composed of cedarwood oil, soft soap, paraffin wax, and certain chemicals, has been applied several times, the men doing the work being compelled to wear gas masks to protect themselves against the fumes from the powerful compound. It is estimated that worms have been at work in the wood for fully 400 years.

MAY CHANGE SEA WARFARE WITH NEW DESTROYERS

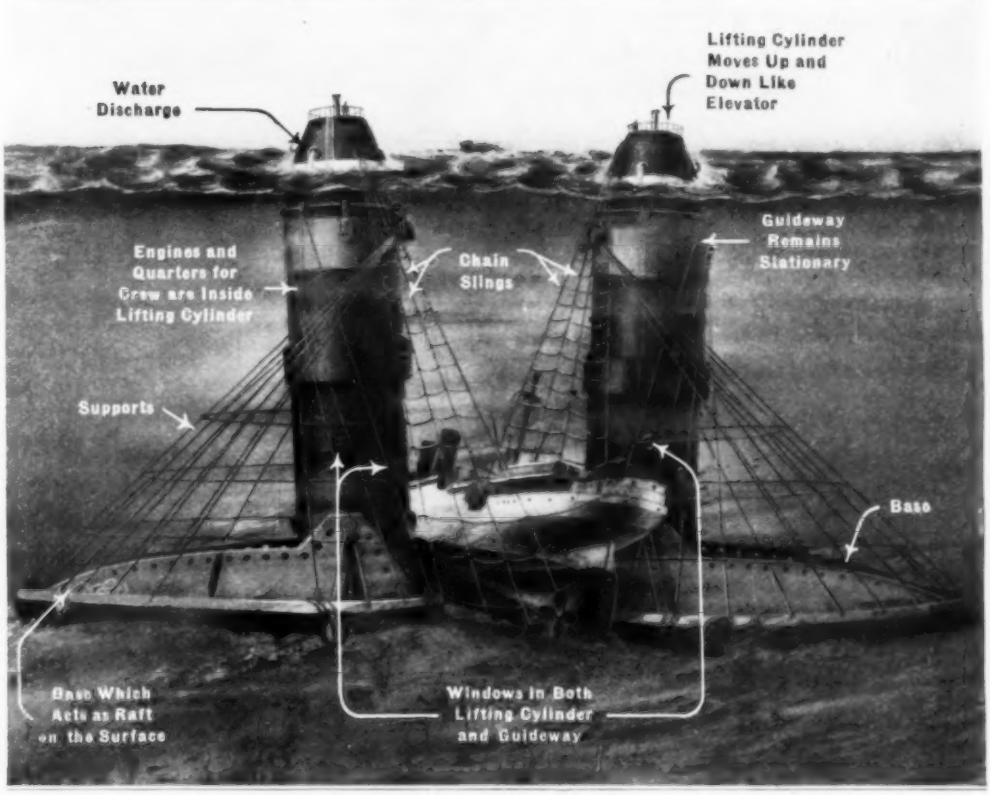
The recent report that the United States is building a new type of flush-deck destroyer, having a very high speed and a minimum of hitting surface, has aroused much speculation among interested laymen as to the details of these boats, which, it has been predicted, will revolutionize sea warfare. While, of course, no particulars are available, it is the belief in some quarters that the new craft bears a resemblance to a certain sea fighter designed by a young naval officer and described as being of 20,000 tons, with a flat protective deck and two towers, one forward and one aft. This vessel carries no guns, but has eight or ten torpedo tubes on each side.

RESTAURANT AND STORE SIX FEET WIDE

A lot, but 6 ft. wide and over 70 ft. long, in Corry, Pa., has been improved with a one-story brick building, occupied by a fruit store and a restaurant. Nearness to a depot made these business ventures worth while, despite the unusually cramped quarters. In summer, ice cream is served under the canopy along the side.

Brick Building, But Six Feet Wide, That Accommodates a Fruit Store and a Restaurant: In the Latter Narrow Tables, Hinged to the Walls, are Used to Save Space

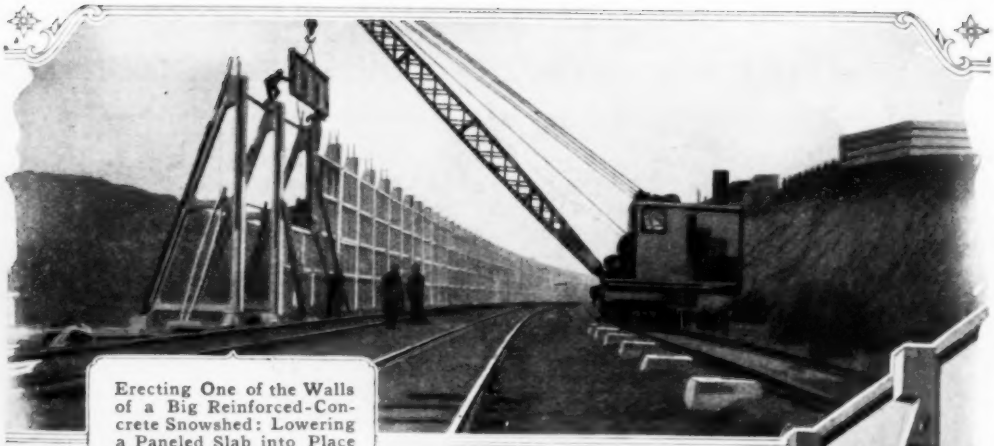
PNEUMATIC SHIP-SALVAGING SYSTEM ANNOUNCED


Lifting Cylinder Moves Up and Down Like Elevator
Water Discharge
Guideway Remains Stationary
Engines and Quarters for Crew are Inside Lifting Cylinder
Chain Slings
Supports
Base
Base Which Acts as Raft on the Surface
Windows in Both Lifting Cylinder and Guideway

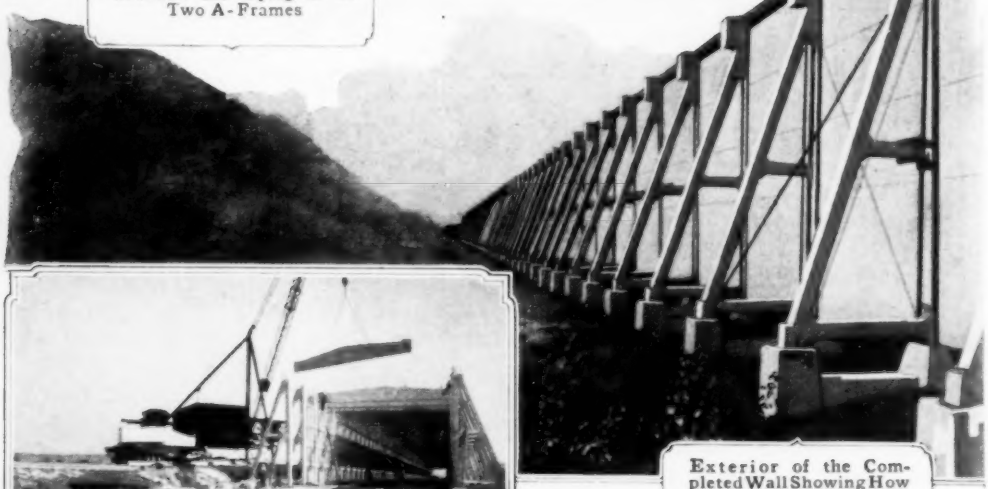
The Massive Tanks at Work Raising a Sunken Ship to the Surface: Vessels at Depths of 300 Feet, the Inventor Claims, could be Recovered by This Pneumatic System

For recovering vessels sunk at depths of 300 ft. or less, a new salvaging apparatus of great power and radical design has of late attracted some attention in marine circles. Telescopic cylinders are arranged to move vertically within protecting guide tubes attached at their bases, by means of universal joints, to large horizontal water-ballast tanks that, when submerged, rest on the floor of the sea and serve the purpose of feet. In use, units of this sort would be placed on opposite sides of a sunken ship, beneath which hoisting cables would be swept. By alternately flooding them and discharging the water, the cylinders are made to descend and rise in their guides. Their buoyancy supplies the power that lifts a ship to the surface, for as they rise they pull the hoisting cables. The towers, forming the legs of the salvaging units, lie in a horizontal position on top of the ballast tanks, or feet, when towed from one place to another. The immense number of vessels torpedoed during the present war makes the salvaging field a rich one for the future. Therefore equipment that can economically recover liners wrecked in comparatively deep water is of great interest to the shipping industry.

¶The United States is facing a serious shortage of lenses for aeroplane cameras similar to that which Great Britain experienced at the outset of the war, and to meet the emergency the chief signal officer at Washington has issued an appeal to private owners of lenses to place them at the disposal of the army.



Erecting One of the Walls of a Big Reinforced-Concrete Snowshed: Lowering a Paneled Slab into Place between the Uprights of Two A-Frames



Exterior of the Completed Wall Showing How the A-Frame Bracing Holds the Slabs and Supports the Roof Beams

Swinging a Roof Beam into Position: The Structural Members were Cast in a Yard at Rock River

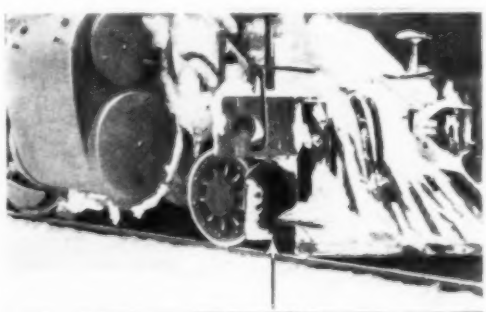
This Most Modern of Snowsheds Is Not Only Permanent in Construction, but Also Light and Airy. It will be Observed That in the Right Wall the Upper Row of Slabs has been Omitted and That Light Streams through the Roof above Each Track

Boring through a Solidly Packed Drift with a Rotary Plow: For Days and Days the Gale Swept Fine Snow and Sand into Railway Cuts and Natural Depressions, While Hundreds of Men Slaved to Keep the Line Open

FIGHTING BLIZZARDS TO MAKE THE SCHEDULE

NEXT to the safety of passengers, the maintenance of the schedule is the most important consideration in modern railroading. How the big lines annually battle terrific blizzards and mountains of snow to keep traffic moving forms a thrilling chapter in the present-day romance of big business.

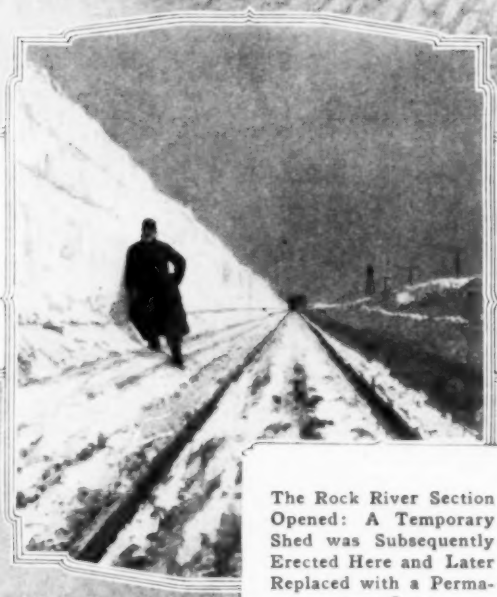
A year ago, between January 21 and February 5, dozens of trains were blocked in the Rock River section of the Union Pacific Railway in southeastern Wyoming by the worst snowdrifts ever encountered on the system. With elaborate equipment hundreds of men fought day and night to keep the rails cleared while a storm of unprecedented fury raged. For 21 days in January, when deep snow covered the plains, the wind averaged more than 40 miles, and even reached 81 miles, an hour. The gale mixed the fine, dry snow with sand and dust, and packed it solidly in natural depressions and cuts. So hard were the banks that the powerful rotary snowplows were at times almost helpless. In one case more than four hours were spent in clearing a single track through a cut only 600 ft. long. Some cuts had to be bored four and five times. Winter had made a staggering surprise attack at a vulnerable point and transportation was demoralized. As quickly, however, as the immediate emergency had been met, the company erected temporary sheds to prevent the recurrence of the trouble and then began plans for permanent work that is now nearing completion.



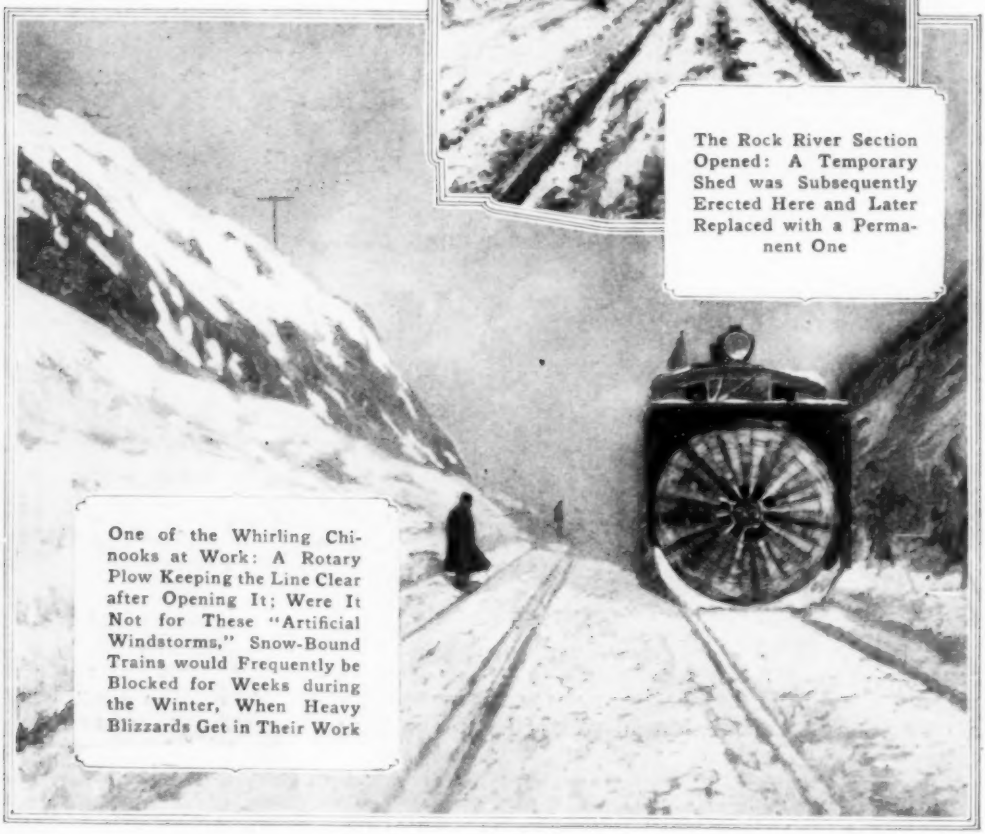
Arrow Indicates Snow Scraper, a Steel Deflector That, When Lowered, Clears the Rail

Reinforced-concrete snowsheds have been erected on the Medicine Bow-

Clearing the Second Track with a Spreader After a Plow had Cut through a Passage: This Method was Used in Places Where the Depth of the Snow did Not Render the Equipment Helpless. Work was Continued Day and Night Until the Enormous Task was Completed



The Rock River Section Opened: A Temporary Shed was Subsequently Erected Here and Later Replaced with a Permanent One

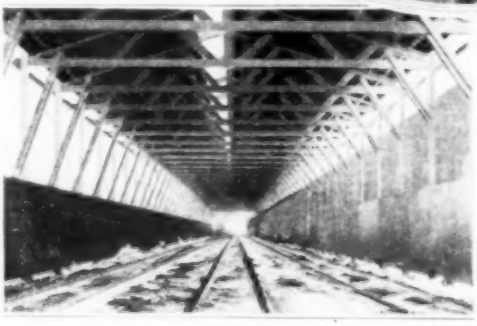


One of the Whirling Chinooks at Work: A Rotary Plow Keeping the Line Clear after Opening It; Were It Not for These "Artificial Windstorms," Snow-Bound Trains would Frequently be Blocked for Weeks during the Winter, When Heavy Blizzards Get in Their Work

After the Tracks were Cleared at Rock River, the 1,200-Foot Temporary Shelter Pictured Above was Erected in Midwinter to Prevent the Wind-Driven Snow from Again Tying Up Traffic

At the Side Is One of the Wedge Plows That Assisted in Keeping the Line Open during the Blizzard. It is Pushed by Two Locomotives Carrying a Short String of Flat Cars as Ballast

Below: Looking through the Emergency Shed Built with Sheet-Metal Sides; It has Since been Replaced with a Much Longer Reinforced-Concrete Structure That Permanently Shields the Track at This Point



Below: A Powerful Rotary Plow in a 10-Foot Cut, Opening the Way through a Long Bank of Snow. Thousands of Feet of Track were as Deeply Covered as the Stretch Shown Herewith

Nine Trains in Line Waiting for the Tracks to be Cleared through the Cuts Ahead: In Such Places as This the Wind Fanned the Snow from the Rails

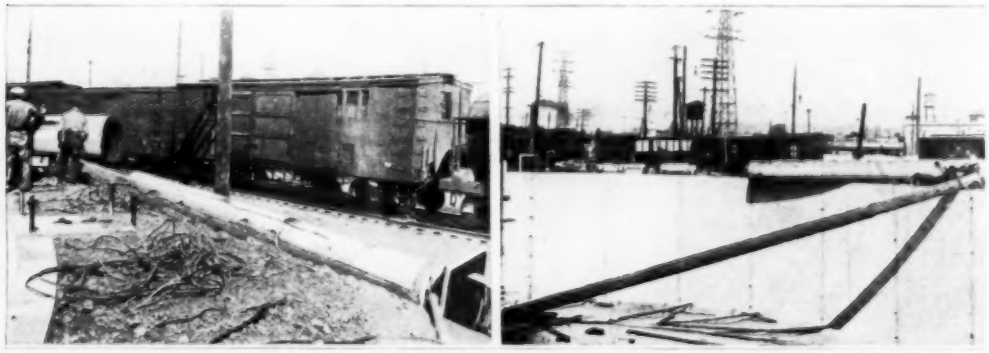
Rock River section of the system. The permanent fireproof structures, designed to meet all possible contingencies, represent a significant step in railroad engineering. Essentially they form a strong line of fortifications against wind-driven snow. They are remarkable structures of interesting character. One built at Rock River is 4,480 ft. long and is to have a 1,120-ft. fireproofed timber addition that will give it a total length of more than a mile. Part of it covers three tracks. At Wilcox, 1,500 ft. of double-track shed has been finished, while an 1,880-ft. structure near Medicine Bow and a 500-ft. shed at Sulphur Lake are expected to be completed early in January. The 8,360 ft. of permanent shed represents about a $600,000 investment. In addition to this work the company has erected a considerable amount of timber snow fence and widened a large number of cuts.

The three-track shed has a width of 48 ft., while the two-track ones are 34 ft. wide. They all have a clearance of 24 ft. above the base of the rails. A particularly noteworthy feature is that they are light and airy. A row of the roof slabs over each track and the top slabs of the leeward walls have been omitted, to provide ventilation and a ready means of escape for the smoke.

Concrete piles, driven to depths of from 10 to 30 ft., form the foundations. Heavy concrete girders that support the roof extend across the A-frames that brace the sides. Long concrete paneled slabs, fitted in grooves in the uprights of the A-frames, constitute the walls. All the structural members were built in a yard established at Rock River. Because unit construction has been followed, it will be possible to disassemble the snowsheds and move them to other locations, should it become advisable.

BROKEN BY A FALL, COLUMN HANGS ON PIT'S EDGE

The work of erecting, at Los Angeles, a large gas tank that was being moved from San Francisco was seriously interrupted not long ago when hoisting machinery gave way, letting one of the 60-ft. steel columns fall and break in two. Only a stroke of good fortune prevented more serious damage than actually resulted. The column, weighing seven tons, was being raised by a derrick when two turnbuckles, connected with guy wires that held the hoist in place, broke and the load crashed to the ground, striking the rim of the concrete-lined pit in which the tank was to be erected. But for the fact that one-half of the steel cylinder struck, and was penetrated by, an anchor bolt projecting from the concrete, it would have toppled over into the pit, which was 25 ft. deep. This additional fall onto a concrete floor doubtless would have crumpled it considerably. The 90-ft. mast of the derrick was also broken.



The End of the Broken Column is Shown at the Left and, a Little Nearer, Are Anchor Bolts Similar to One That Kept the Big Cylinder from Falling Farther. Right: View Showing the Concrete Wall of the Pit and a Section of the Broken Column Hanging over the Edge

LONG INLAND-WATERWAY HAUL A SUCCESS

In response to the government's patriotic appeal to shippers to relieve the railways by utilizing our waterways more, a wire and steel company recently shipped 1,200 tons of pig iron from Sheffield, Ala., to Peoria, Ill., via the Tennessee, Ohio, Mississippi, and Illinois rivers. The length of the water route was 681 miles and it was traversed in 10 days. The shipment originated in Woodward, Ala., and was taken to Sheffield by rail in 33 cars. The only delay experienced was at one of the locks in the Illinois River where the water proved to be of insufficient depth. Government engineers along the route assisted in piloting and otherwise aiding the river fleet. While the normal cost of such transportation could not be determined from one trip, the company concerned was well pleased and began at once planning other shipments by the same route.

WHIPPING POST IN USE TODAY AS OF OLD

That the whipping post is not altogether a thing of the past, as many persons suppose, is shown by the fact that it is still used in the state of Delaware, in inflicting punishment for such crimes as theft and disorderly conduct. The accompanying illustration shows the post that stands in the county-jail yard at Dover. It is octagonal and is some seven feet high. Hinged to two sides are iron manacles which are clamped over the wrists of the prisoner to hold him still while the whip is applied to his back.

SURE-FIRE TRENCH GRENADE CORPORAL'S INVENTION

Military authorities speak well of an aeroplane-bomb type of hand grenade that has been invented and turned over to the government by a corporal stationed at Fort Douglas. Its technical details of course are withheld, but roughly it consists of a streamline bomb supplied with four vanes and a handle of liberal length. It is 16 in. long, weighs about three pounds, and is exploded either by contact or time fuse. Detonation is said to be certain, for when hurled, the missile always falls nose down.

Close View of Grenade and the Way in Which It is Thrown

POLICE WELCOME AUTOISTS AND EXPLAIN SPEED LAW

The police of Spokane have adopted new tactics in enforcing the speed laws of that city, which should enlist the coöperation of motorists rather than arouse their antagonism. The car of a visiting autoist is courteously brought to a stop, as it enters the city limits, by an officer who extends a welcome to the stranger and hands him a booklet containing lists of interesting places in Spokane and also a copy of the local traffic ordinance. After wishing the travelers a pleasant stay in the city the policeman allows them to continue their trip, doubtless a little surprised by the unusual greeting, but certainly more ready to observe the regulations.

OBSERVER HIDES IN DUMMY HORSE NEAR ENEMY TRENCH

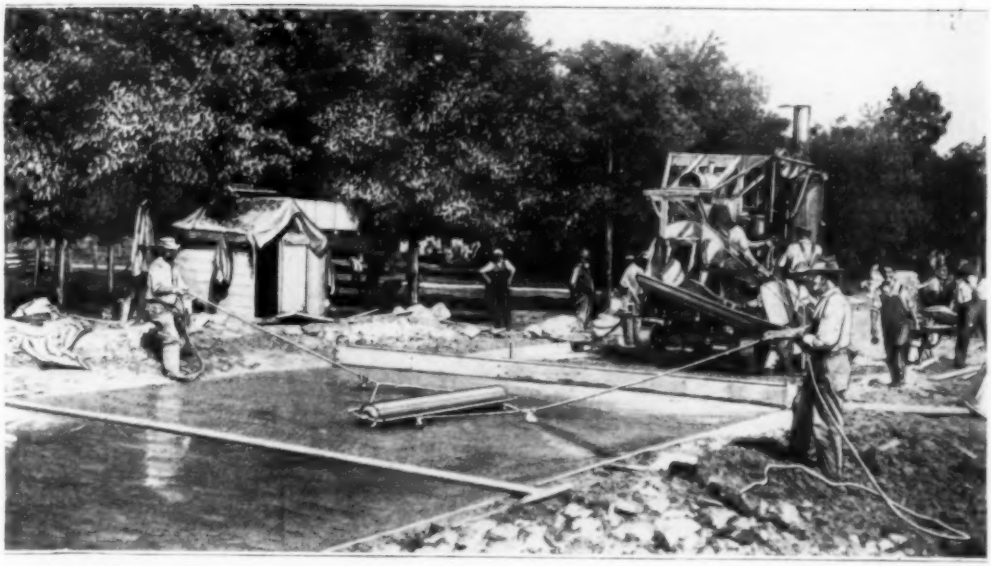
History's ancient example of camouflage, the Trojan horse, has a modern variation of peculiar interest. During the fighting near Craonne on the western front, some time ago, a horse broke his traces and dashed across "No Man's Land" toward the German defenses. When near the edge of a first-line trench he fell. The French immediately made the best of the opportunity and set camouflage artists at work fashioning a papier-mâché replica of the dead animal. Under cover of darkness the carcass was replaced with the dummy. For three days observers stationed in the latter were able to watch the enemy's movements at close range and telephone their information to headquarters. Finally, when one observer was relieving another, the Germans discovered they had been tricked, and destroyed the post.

Concealed within the Papier-Mâché Horse, Observers Watched the Enemy at Close Range

MOVIE CAR BRINGS HEALTH LESSONS TO FARMERS

The wonderful educational possibilities of motion pictures find fresh illustration in an itinerant outfit which the board of health of North Carolina sends throughout that state, exhibiting films that teach disease prevention. The equipment includes an automobile truck costing $750, and an extra gasoline engine that drives a direct-current generator for a motion-picture projector. The traveling crew, consisting of a lecturer and a mechanic, advertises its own exhibits with handbills and placards. The projector is set up in a hall or school and is supplied with current through a stage cable stretched through a door, or window, from the car. A string of incandescent lights usually supplants the regular lamps, which are inadequate and cannot be turned off and on quickly. The cost of this very effective educational work is about $90 per week. A camping outfit is carried in the automobile.

Traveling Motion-Picture Outfit with Which Exhibits Pertaining to Typhoid, Tuberculosis, the Fly Menace, and Other Health Themes are Given in North Carolina's Rural Regions



Concrete-Highway Construction: Pulling the Squeegee Back and Forth to Remove Excess Water from the Finishing Mixture

ROLLER USED IN FINISHING CONCRETE PAVEMENTS

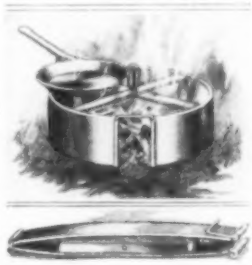
In concrete-highway construction it has been found that a rolling squeegee offers valuable assistance in consolidating the top layer of material and removing its surplus moisture. Employment of the device permits enough water to be used in the finishing mixture to simplify application. By putting the roller in competition with a wood float, comparative tests have been made which are said to have shown that concrete slabs finished by the former method have about 20 per cent greater strength than the hand-leveled ones. In one city more than 300,000 square yards of pavement have been constructed by the new plan.

ORPHAN SAILORS TO HAVE GODPARENTS

For the sake of those boys in our navy who have no parents or other relatives back home to send them letters and remember them at the holiday season, a new organization has been formed called the "Order of Godfathers and Godmothers of the Navy." It has the indorsement of the Navy Department, it is said, and will undertake, through its various members, to act in a parental capacity for the sailors who are orphans. Data are already being secured for the order from chaplains and Y. M. C. A. secretaries. It is the plan to have the members keep in close touch with their "godsons" throughout the war.

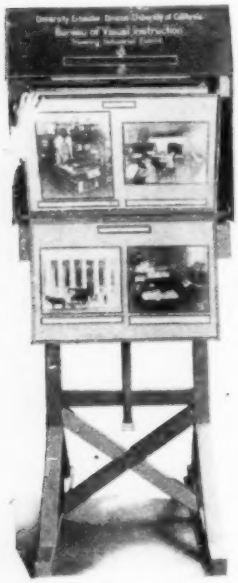
CIRCULAR CAMP STOVE FOLDS COMPACTLY

One of the simplest and least expensive of the many folding camp stoves now being used is the invention of a woman. It consists of two flexible pieces of sheet iron with their ends linked together so that by distending a folding iron frame located between the two parts, the latter can be made into a circular inclosure with sides 6 in. high. A gap between two ends affords draft for the burning fuel within. Folded, the stove measures 20 by 6 by 1½ inches.



PORTABLE SETS OF PHOTOS FOR SCHOOL USE

Several series of instructive photographs, relating to representative industries, are now being circulated by the University of California among the schools of that state, housed in steel containers of special design. The pictures are mounted on well-bound leaves and then varnished to prevent their being soiled. By means of metal eyes each leaf is fastened to rods, at the lower side of the case, which serve as guides. For exhibition purposes the container is mounted on a standard and opened at the front, exposing the leaves to view. By turning down one leaf after another each one can be brought to the front in turn.



SOLDIERS' WARMERS REMAIN HOT FOR HOURS

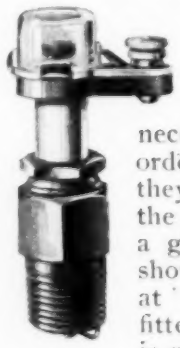
Warmers to be carried in the hands, or pocket, have recently been submitted to our military authorities for trial, which, if found to be satisfactory, should be of great service in lessening the dangers of exposure to cold. One style is made like a thin, pocket-size flask, while another is disk-shaped and ½ in. thick. These are filled with a chemical composition, the formula for which is not stated. After being heated in boiling water they remain hot for 30 hours, it is claimed, and at the end of that period the addition of a small amount of a certain chemical will renew the heat for a like period.

HANDY ELECTRIC-UTENSIL PLUG AND SOCKET

A new plug and receptacle for use in connecting electric cooking utensils with a circuit is designed to be installed under a rug or carpet. An automatic shutter keeps out all dirt. The plug has two prongs, insulated except at the tips, that can be inserted through a rug into the socket without injuring the floor covering.

NEW SPARK PLUG FITTED WITH GLASS HEAD

For motor vehicles, a glass-topped spark-plug head with a circular gap that acts as an intensifier has been developed. When plugs are supplied with the accessory, it becomes unnecessary to test them in order to determine whether they function properly. In the event of engine trouble, a glance beneath the hood shows whether the plugs are at fault. A metal collar fitted to an insulating disk is mounted on top of a plug to form a circular trench around the screw. This provides a spark gap and is covered by a transparent dome.



¶Not long ago a worker in an industrial plant was overcome with ammonia fumes, and since no pulmotor was available, an electric fan was effectively used to force a current of air into his mouth and nostrils.

INTIMATE GLIMPSES OF SALEM, OREGON

By OUR TRAVELING EDITOR

HOW does your city look to the casual visitor? Next month our traveling editor may tell you. This month he visited Salem, Oregon, and found it so attractive that an influx of new population there would not be a surprising result of his account. We'd like to go ourselves, and smell the fresh-cut lumber wet in the winter rain, and toast our toes at one of the pleasant wood fires, or even saunter forth in rubbers and storm coat along her wooded avenues. A little more rain than is always agreeable, perhaps, but—all in all—too bad that more of the cities our traveler sees are not in Salem's class.—Editor.

THIS is "spotless town"—and one of the prettiest state capitals I have ever set foot in! It is a city of fine wide streets and beautiful buildings, and with an air of hustle and enterprise seldom to be found in the governmental seat of a state.

Also, Salem's trees make a vivid impression upon the first-time tourist. If the buildings that constitute the city were to be removed, a fine forest would still be left standing—with the exception, of course, of the area occupied by the down-town business district. The Oregon pine is in evidence everywhere, and particularly in the city park—Wilson Park by name—in dooryards and along the street parkings.

Where Oregon's Laws are Made: One of the Most Beautiful of Our Nation's State Capitols

Farms Supplant Timber Lands

Aside from being the seat of the state government, Salem is essentially an agricultural and lumbering community. There are millions of feet of standing timber still in plain view on the hills just outside the city limits, and several great sawmills are the principal commercial resources. Much of the surrounding "logged-off land"—as the natives call it—has long since been turned over to agriculture, and here the various branches of dairy husbandry have been highly developed. There are several large creamery plants in Salem, and Salem cheese has become a standardized product throughout the entire Northwest.

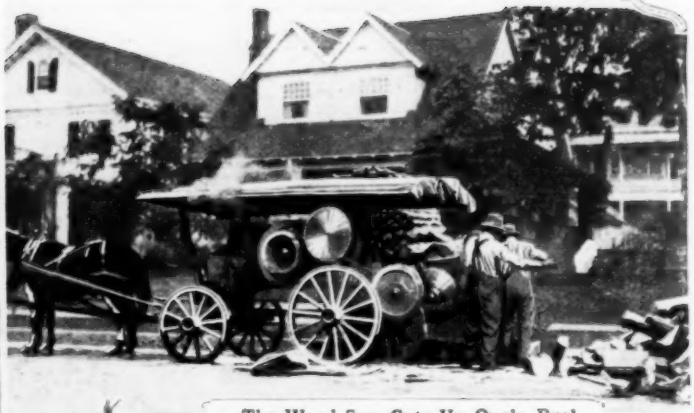
There is an abundance of available water power in the vicinity of Salem, but as yet this is only partly developed. It seems that the population of the surrounding country is at present altogether too sparse to seriously consider any extensive degree of industrial development. The residents of Salem are principally persons who are connected with the governmental business of the state, those engaged in the lumber and dairy industries, and, of course, the requisite number of doctors, lawyers, merchants, etc., who go to make up a community.

Salem seems to be one of the very few cities to anticipate that it might grow some time, and has built its streets accordingly. All are unusually wide, with ample parking and sidewalk space to take care of probable future requirements.

The high curbings and correspondingly deep gutters of Salem are really a striking feature. When it rains there it simply comes down in buckets, and the fellow

Looking West in State Street, the Principal Business Street of Salem, Oregon

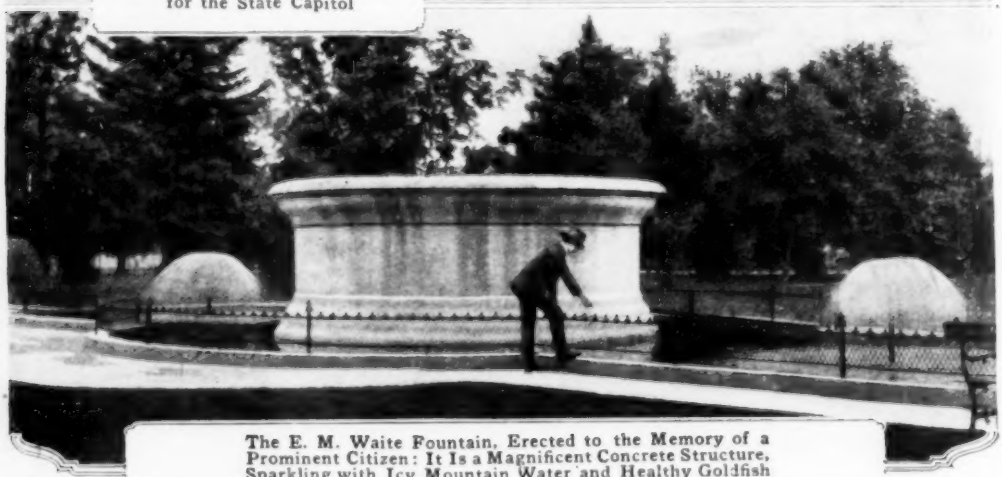
Artistic Flower Arbors Beautify the Marion County Courthouse Corners



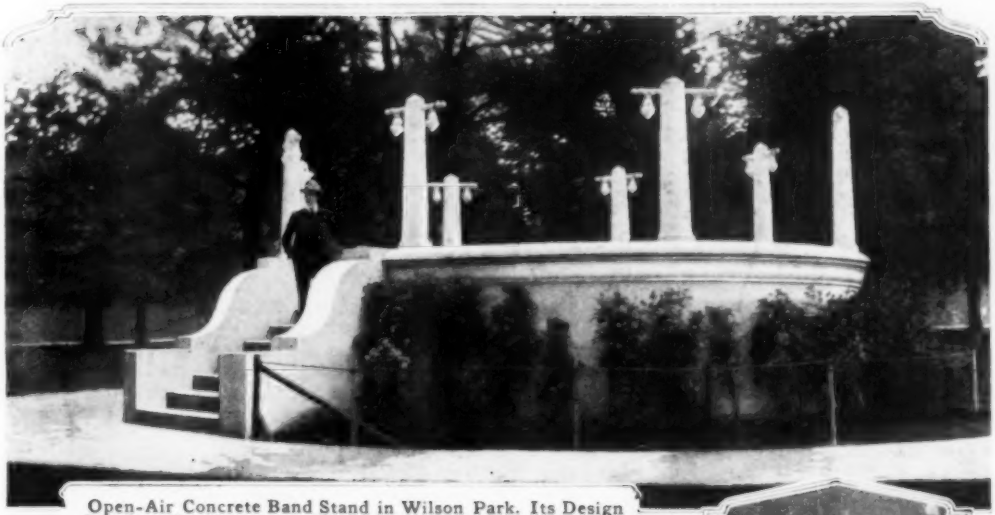
The Wood Saw Cuts Up One's Fuel at the Door. Delivered to the Cellar, Maple Costs Five Dollars a Cord

The Marion County Courthouse: Frequently Mistaken for the State Capitol

Fancy Trimmed Shrubbery Is a Conspicuous Part of the Capitol Gardening



The E. M. Waite Fountain, Erected to the Memory of a Prominent Citizen: It Is a Magnificent Concrete Structure, Sparkling with Icy Mountain Water and Healthy Goldfish



Open-Air Concrete Band Stand in Wilson Park. Its Design Involves Novelty, Art, and Permanence, and Seems to Typify the Progressive Spirit and Alertness of the State

Deep Gutters Are Essential Where Rains Are Heavy. The Sidewalks are Bridged across Them

Eaves Protect Uncle Sam's Posters against Rain

The Gardeners' Tool Box on the Capitol Lawn Is Also a Restful Bench

How a Resident of Salem Gets in His Winter Fuel Supply: Cord Wood is Hauled from the Forests, Cut into Stove Lengths by a Portable Saw, and Delivered to the Cellar

who gets under an umbrella to keep out of it is like the ostrich that sticks its head in the sand and thinks he is hidden from his enemies. Oilskins and rubber boots are said to be the only protection against rain in Oregon, which has been called the wettest wet and the driest dry state in the union. This has nothing to do with the liquor question, but it refers entirely to climatic conditions. Take a map of the state of Oregon, for instance, and note that the Cascade Mountains divide the state into eastern and western halves. The prevailing rain-bearing winds blow from the west and naturally they have to rise to a great height to get over the mountains. The result is that the moisture is condensed and precipitated on the western slope of the mountains. The western half of the state is therefore deluged with moisture while the eastern half is so arid and barren as to be scarcely inhabitable. The curbs of Salem are therefore ordinarily so high that one almost needs a stepladder to get up and down them. Also when they are running brimful during the winter rainy season some means of getting across them is quite essential. Long sloping concrete runways have been built to accomplish this.

Wilson Park—the principal city park (named in honor of its donor, not for the president)—is continuous with the grounds of the capitol. It occupies a swath of land several city blocks in width and nearly half a mile in length, right through the center of Salem.

The whole is a most excellent bit of landscape gardening, and with the state buildings form a scene not readily forgotten.

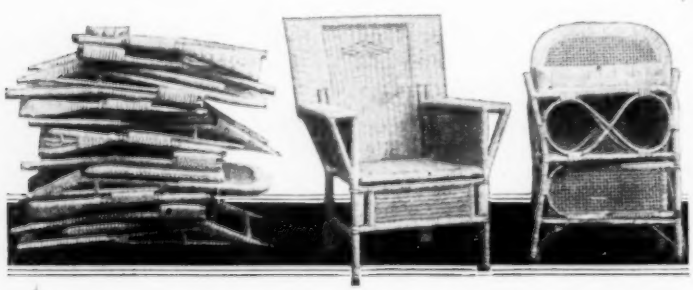
Wood Fires the Rule

In Salem the fuel situation is not such a serious question as it is in the East. Nothing is so cheap or so plentiful as wood, and "slabs" are the universal fuel. Slabs are the sides and bark sawed from logs in the manufacture of lumber. Loads of slabs in lengths of six or eight feet are generally delivered in front of the door of a Salem residence. The delivery is followed by the wood saw—an institution said to be purely Oregonian. The wood saw is generally a motor truck or even a horse-drawn vehicle on which a small circular saw is mounted. The saw is usually driven by some sort of a gasoline engine, and is used to cut the slabs into convenient stove lengths. The wood, after being cut up, is delivered to the cellar or wood shed. Slabs sell in Salem for an average price of $3.50 per cord, sawed up and delivered. Maple stove wood is $5, and oak, which is considered by far the best fuel, $7 a cord.

A great deal of fruit is raised in the vicinity of Salem. Most of this is apples. There are also peaches, pears, cherries, and grapes, and this industry, while at present only starting, seems to be thriving so well that its future is assured. The inhabitants of this section of the state believe that with the passing of the lumber industry—which is but a matter of a comparatively short time—the production of fruit is the key to the future development of the state. I might write a book on how the forests of the great Northwest are being devastated, but will dismiss the subject by saying that if protective legislation is not very soon introduced Oregon's lumber industry will soon be in the same category with the bison, the passenger pigeon, the roller towel, and the public drinking cup. It will take 400 years of forest protection to rehabilitate the Oregon timber lands that are now stump-strewn wastes, and at the present rate of forest destruction the millions of feet of timber still standing will maintain the existing lumber industry for but a few brief years. Salem people realize this and are already seeking to develop the other industrial possibilities of the surrounding country.

SHIPPING COSTS INFLUENCE CHAIR CONSTRUCTION

To lessen freight rates a manufacturer has designed wicker chairs that may be collapsed for shipment and quickly assembled at their destination. They are held together by dowels and consist of two parts, the seat and back forming one of them and the sides and front the other. The arrangement permits four of the chairs to fit in about the same space that one of them would normally occupy. On large consignments the saving is considerable.

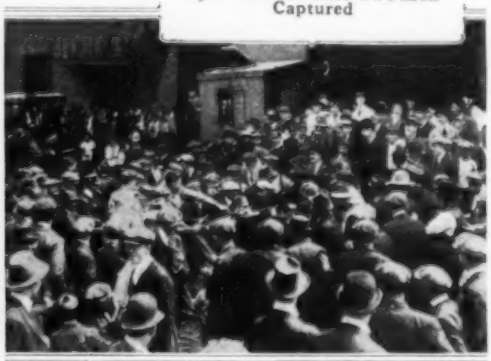


Four of The Chairs can be Folded and Made to Occupy About the Same Space That One Normally Fills, as is Shown at the Left and Right. In the Middle One of the Pieces is Pictured Assembled

The Banana Getters Were Not Particular about Their Containers, Some of Them Finding Wastebaskets Handy and Ample

People Came by Water as Well as by Land to Obtain the Coveted Fruit and Some Were So Fortunate as to Make Off with Their Boats Loaded

In the Big Throng, Team Work Counted, as Evidenced by the Prize These Two Men Captured



Boys in the Crowd Evidently Believed in "Equal Distribution of Wealth" and So Aroused the Ire of the Woman Shown at the Left, by Lessening the Size of Her Bulging Bundle. The Right-Hand Picture Shows Them More Violently Engaged

SHIPLOAD OF BANANAS GIVEN AWAY

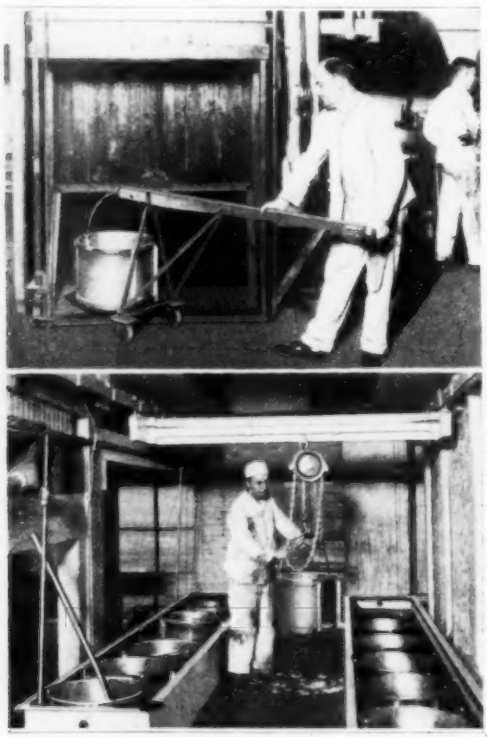
It is not difficult to imagine with what eagerness throngs responded to an announcement made recently by a steamship company in Boston that it would give away a cargo of bananas, consisting of 30,000 bunches. The first plan had been to dump the fruit into the harbor, but this was frowned on by the authorities. A short time before, one of the company's vessels had arrived in port laden with fruit that had ripened prematurely because the refrigerating plant was out of commission. The throng that shared in the mad scramble for the bananas included young and old, incidents humorous and belligerent marking the distribution.

HOLDER FOR FOUR FLAGS REVOLVES IN BREEZE

One of the newest flag holders, designed to be attached to the filler cap of an automobile, is built like an anemometer, each of the four arms supporting the wind cups being provided with a metal loop in which a small flagstaff may be inserted. If there is a breeze the holder and its flag will rotate whether the car is running or standing still.

LABOR-SAVING EQUIPMENT REDUCES WORK BY HALF

By the introduction of improved equipment in a fruit-preserving factory, one man is now able to do the



Device for Carrying Heavy Preserve Pans Which Enables One Man to Do the Work of Two. Below: Traveling Crane That Makes a Two-Man Task Easy for One Man

work of two in each of two departments. Formerly two workers were required to carry 175 to 200 pans each day from the kettles to the scales and thence to the elevator, each pan weighing 125 to 130 lb. Now one man does the work, using a carrier consisting of a long beam, one end of which is supported by a light frame mounted on two wheels, and provided with a hook from which the pans are hung. In the other instance of labor saving, one worker now uses an overhead traveling crane to transfer the pans from the elevator to the cooling tanks. Formerly two men carried the pans by hand, each working harder than the one now performing the task alone.

SOUTHWESTERN TOWN PLANS FREE WATER SERVICE

Water is to be supplied without charge to the citizens of Abilene, Texas, if a municipal venture recently launched is carried to completion. By constructing a 1,000-ft. dam across the open side of a natural horseshoe basin in the near-by mountains, a lake, approximately a mile wide and 10 miles long, will be formed. Below this site, and nearer the town, a reservoir will also be built. It is estimated that the annual rainfall of the watershed will supply about 6,000,000 gal., of which only a small part will be required by the community. The rest of it will be used to irrigate some 5,000 or 10,000 acres of adjacent land suited for truck farms. The revenue from this and from power developed by contemplated hydroelectric installations will, it is thought, pay operating and maintenance expenses so that the town can give its inhabitants water service without cost.

MINIATURE OF "SOO" LOCKS IN SUNKEN GARDEN

A miniature canal lock, modeled after the locks at Sault Sainte Marie, is a landscape feature that lends novelty to a sunken garden adjoining a large paper mill on the Canadian side of the "Soo." The sides of the garden lock are lined with courses of heavy

View of a Paper Mill's Sunken Garden on the Canadian Side of the "Soo," Showing the Miniature Lock Modeled after the Larger Ones in the Vicinity

cut stone, while strong wooden gates serve as barriers to keep the water at the proper levels.

Reproduction of an Artist's Sketch Showing 70 Reinforced-Concrete Buildings Erected by One Construction Company in One Year, in Various Parts of the Country

EQUIVALENT OF CONCRETE CITY BUILT IN A YEAR

Impressive evidence of the amount of work accomplished by an eastern concrete-construction company is found in an artist's drawing, made to scale with the aid of blueprints and photographs, showing 70 buildings erected by the concern in the course of 1916. All of these structures are of reinforced concrete and were built for industrial purposes. If assembled in one region they would make a veritable city, as the sketch shows. The total cost of the buildings was $9,000,000, and their floor space aggregates 100 acres. Approximately 360,000 bbl. of cement and 25,000,000 lb. of reinforcing steel were used in the work. The average rate of construction was four stories in 18 weeks.

¶It is planned to include in Illinois' centennial celebration, which will be held this year, an elaborate motion-picture production portraying the 12 most important events in the state's history.

NEW UNDERBRUSH CUTTER WORKS LIKE SHEARS

A new implement for cutting down underbrush and saplings up to 3 in. in diameter is claimed to be superior to an ax for such work, because it makes

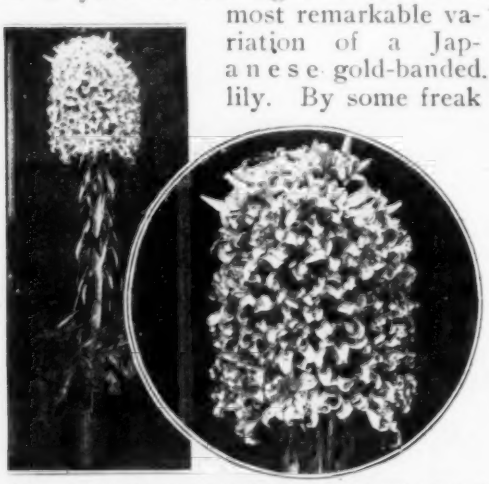
A Convenient Implement for Cutting Brush and Saplings, Which at One Stroke Clips Off a Trunk Close to the Ground

a clean cut close to the ground and near-by undergrowth does not interfere with its operation. It is provided

with a strong handle pivoted to an iron base, the front edge of which is sharpened. In felling a sapling, the implement is rested on the ground with the sharp edge next to the trunk. By bringing the handle forward a curved knife, hinged to the handle a short distance from the lower end, is hooked about the trunk, with its cutting edge opposite that of the base. On pulling the handle backward the two blades cut the trunk off with a shearlike motion.

HUNDREDS OF LILIES GROW ON FREAK PLANT

A few weeks ago there bloomed in a yard at Bellingham, Wash., a most remarkable variation of a Japanese gold-banded lily. By some freak



A Remarkable Japanese Gold-Banded Lily That Stood Six Feet High, as the Yardstick in the Left-Hand Picture Shows: The Cluster Contained 278 Blossoms

of nature three stalks grew together, forming a flat stem very much like the leaf of a cactus, and at the end of this curious formation 278 perfect blossoms appeared. The plant stood about six feet high and the symmetrical cluster of lilies was from 20 to 30 in. in diameter.

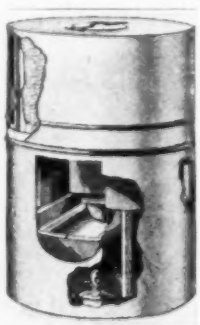
¶The Eiffel tower is to be repainted—a task which will occupy three months and require 40,000 lb. of paint, according to estimates. This, the tallest structure in the world, has proved invaluable during the war as a wireless station.

GOVERNMENT DEPARTMENTS PRACTICE ECONOMY

That our government departments are endeavoring to live up to the principles of economy which have been urged upon the nation as a whole, is indicated by instructions recently issued by the secretary of commerce. All branches of that department have been requested to give special attention to the saving of waste materials and making systematic effort to transfer such materials, without compensation or delay, to any other service or department having use for them. The following instance illustrates how the new ruling operates: The government had accumulated in one place several thousand pounds of old copper and brass and some tons of old rope, awaiting the usual process of sale by auction. However, it was found that such material was needed at one of the navy yards and so it was transferred to that yard instead of being sold. The government thereby saved a considerable sum of money.

HOG WATERER IS SANITARY AND AUTOMATIC

A new sanitary waterer for hogs consists of an upright cylinder containing a reservoir beneath which is a removable trough. The latter fills automatically whenever the level of the water in it drops below the end of the supply pipe, thus permitting a certain volume of air to displace water in the reservoir. In removing the trough to clean it, a valve in the supply pipe is closed automatically so that no water is wasted. In winter a lamp is placed beneath the trough to keep the water warm. An air space around the supply tank keeps the water cool in summer.



EATING WALRUS WHISKERS

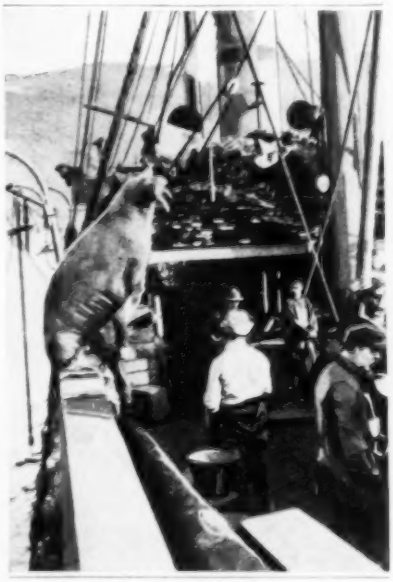
By FITZHUGH GREEN

Members of a North Greenland Eskimo Tribe: Standing Second from the Right Is a Young Girl Wearing Fox-Skin Breeches That Distinguish Her from the Males, Who Wear Bearskin Breeches

AMONG the Smith Sound tribe of northernmost Greenland the favorite diet is walrus meat. When one of these gigantic animals has been harpooned from the kayak, or native skin boat, a float attached to the shaft line indicates the animal's efforts to escape. A square drag held by a bridle prevents rapid swimming and soon tires the animal out. He comes up to blow. The natives close in and drive their sharp lances into his lungs.

After a struggle sometimes lasting many hours the walrus is finally dispatched. His 2,000-lb. carcass is then towed to the ice edge and hauled out for butchery. Such skillful dissection as the native can make comes of the everlasting bitter cold which punishes in a dreadful way the slow or awkward worker.

Shoulders, flippers, and sections of the trunk are buried under a pile of stones to guard against the depredations of thieving foxes. Entrails are raked out and fed to the famished wolves which form North Greenland dog teams.



A Splendid Catch Made in Arctic Waters: Hoisting Aboard Ship a Walrus Weighing 2,830 Pounds

Follows then the feast. While snow igloo is being built and little blubber lamp started, certain delicacies are collected. Heart and liver are substantial bits—almost 40 pounds of juicy flesh. For entrée a segment of the outer flipper has been saved, a little stringy as a rule, but of a peculiar rancid flavor exceedingly tasty to the native palate.

The creature's stomach may contain several gallons of clams he has recently dug from under the glacier's foot. One rip of a knife and the yellow lumpy broth foams out over the snow to the immense delight of the hunters. Instantly all turn to and swallow great mushy handfuls of the repulsive, half-digested mess.

By this time the pot is on and some thick lumps of meat and fat from near the backbone are boiling with fragrant (to the Eskimo) odors. Much meat has already been devoured raw by those too hungry to wait. The meal —if such it can be called—is silent except for gulping grunts and a great smacking of greasy lips.

Men are almost full. Sleeping skins are spread. Tales begin in sleepy, droning tones. "Brother, a bit of mum-muk-to-suaq" (the most delicious part), one suggests. At which a young man rises and goes out. Presently he returns with the huge tusked head. Dangling from it is a foot or so of thick, white windpipe. This is cut into short lengths, apportioned out, and eaten with the greatest gusto.

"Now for his nib's upper lip!" or words to that effect, exclaims the leader. Whereupon he deftly clips off the whiskers, shaving close lest some be lost, and doles them out to the happy circle of his companions. Such is the end of a perfect day near the Pole! Each whisker is from two to six inches long, and about the size of a pencil lead. It is of a grayish color, tough and gummy, and has a sweetish, cheesy taste. Though I have enjoyed this fare many times myself, I cannot recommend its lack of daintiness to weak stomachs.

They're clean enough, and pure—for a walrus washes his face after every meal. It's just what they are that gags.

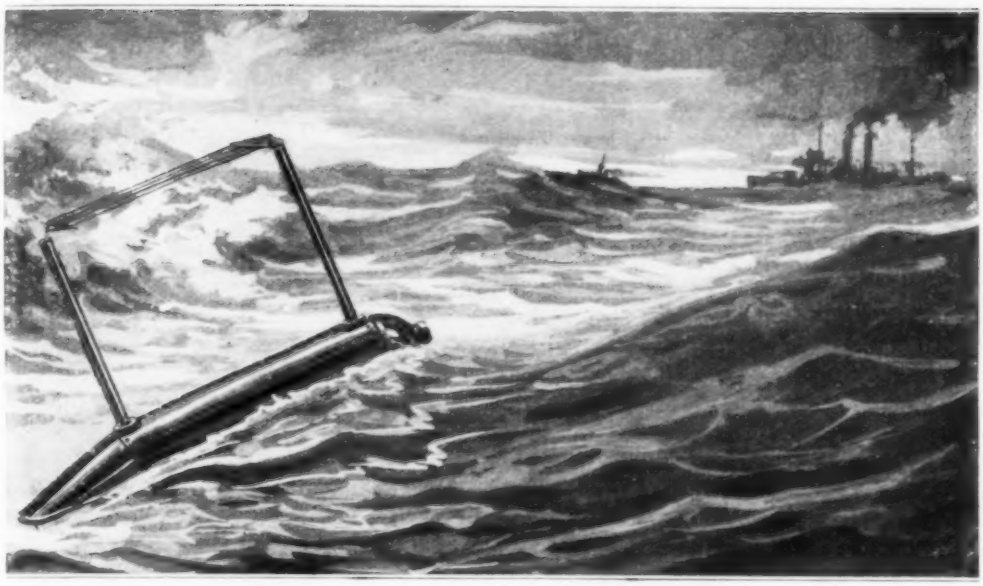
¶The stage of the New York Hippodrome has been provided with a curtain measuring 120 by 37 ft., consisting of a series of oblong banners representing the flags of the United States and 13 of our allies. The curtain is said to win more applause than the most popular number on the programs.

RAILWAY DOUBLE-TRACKED IN MOUNTAIN CANON

At a cost of about $200,000 a mile the Union Pacific Railway has carried out a long-contemplated double-track project in Echo Cañon nôrtheast of Salt Lake. The work is interesting not alone because of the expenditure involved, but also on account of the contrast it shows between railroad engineering of a few decades ago and that of the present. The undertaking has meant the construction of a separate line along the route of the original one. It is seldom that the two tracks appear

Where the Old and the New Tracks Pass through Tunnels 82 Feet Apart

The New Track, on the Up Grade, Eliminates Many of the Curves Made by the Old Line



Unlike Other Radio Torpedoes, This One is Fortified against Interrupting Wireless Impulses That may be Sent Out by the Enemy Vessel for Which It is Headed. It Also Has an Extremely Wide Range of Action and Travels at High Speed

side by side at the same level, and in some places they are nearly 2,000 ft. apart. To compare the two lines: The curvature of the new track is less than one-half that of the old one, while the actual distance saved amounts only to about a third of a mile. A reduction of 33 ft. to the mile has been made in the maximum grade. Because of this and its modified curves, the new line will be used for up-grade traffic.

WIRELESS TORPEDO PROOF AGAINST COUNTER WAVES

Perhaps the outstanding feature of a new radio-controlled torpedo, the invention of a young wireless experimenter enlisted in the navy, is its purported ability to resist interrupting impulses sent out by an enemy vessel. Although a discussion of its technical phases is highly inappropriate at this time, a general idea of its character may be given. It is electrically driven and obtains power from a storage battery contained within it. The radius of action is not limited to a few miles, for enough stored energy to keep the missile moving for ten hours, if need be, is provided. A speed of from 35 to 40 miles an hour, depending upon conditions, is claimed for it. Counter radio waves may affect but not check the torpedo. They merely divert it from a straight course and cause it to zigzag, or tack, toward its target.

DIVIDED ROADWAY PROTECTS TRAFFIC AT CURVE

In entering a western city a well-traveled highway curves abruptly at an incline where it passes beneath railroad tracks. To overcome the danger of collisions, a concrete curb has been constructed to bisect the road at this point and separate traffic moving in opposite directions. This compels drivers to keep to the right.

The Dividing Curb Separates Vehicles Traveling in Different Directions and Makes Safe What Otherwise would Be a Dangerous Curve

SIMPLE MONEY-CHANGING MACHINE

As a substitute for more complicated and expensive devices, a simple quick-change machine, recently patented, possesses special interest. Its principal parts are a wooden base and four or more coin holders or blocks, each penetrated by a vertical hole to receive stacks of coins of various sizes. Each holder may be made to move forward and backward in its guideway in the base, traveling in grooves that lift it above the bottom of the way so as to escape coins lying there. On the under side of each block, just back of the coin hole, is a pin so placed that when the holder is moved forward it pushes the coins along the guideway and discharges them at the front end. When the holder is moved backward, the pieces of money in it drop down into the way, one by one, taking the place of those discharged. Change in any desired amount can be taken from the machine very rapidly because of numbers adjoining the channels, which indicate the sums that will be discharged when a holder is drawn forward to the points designated.

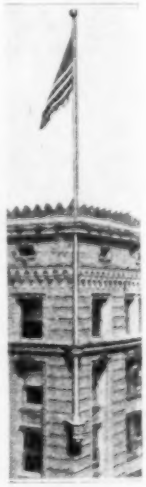
A Simple and Durable Quick-Change Machine Which is Made to Discharge Coins by Drawing Forward the Proper Coin Holder

UNUSUAL ERRORS CAUSE GAS EXPLOSION

Details recently received in this country from Europe of a fatal accident caused by the explosion of an oxygen tank once more prove that no safety precautions, which are in part dependent on some human agency, are infallible. For several years it has been the standard practice in Germany to provide hydrogen containers with left-handed threads and oxygen containers with right-handed threads. In addition, the former were painted black and the latter red. In spite of these regulations a German chemist not long ago discovered that an oxygen cylinder shipped to him contained hydrogen. He returned the container, which was then recharged with oxygen without being emptied or examined. When it was later used for acetylene welding an explosion occurred which killed three men and injured many others. An investigation showed that the error had been made by inexperienced men, and that, temporarily, steel nuts had been used on the container. These were hard enough to force their way onto the wrong threads. Moreover, the cylinder was old and showed no distinctive coloring. Thus, in more than one particular, important precautions were disregarded, resulting in tragic consequences.

SKYSCRAPER'S FLAGPOLE ARTISTICALLY PLACED

An architectural detail which adds to the appearance of the corner of a skyscraper is found in the way in which the flagstaff shown herewith is anchored. The pole extends some distance below the roof just outside the corner, passing through the cornice and a ledge, to both of which it is securely attached. The lower end rests on an ornamental base.



¶British scientists engaged in industrial research are reported to have discovered the secret composition of several optical glasses which were previously made only in Jena, Germany.

Built to Glide, Not Fly, This Craft Attains High Speed with Only Its Nose in the Air

MONOPLANE ICE BOAT KEEPS ONE FOOT ON THE SURFACE

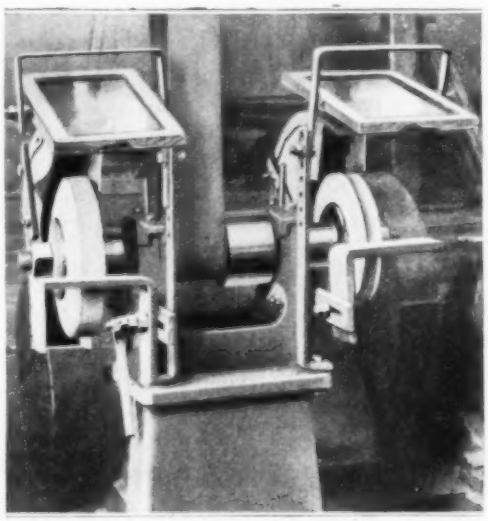
During the months that winter sports are at their height a strange winged sled makes its appearance on the smooth ice of Lake Placid in northern New York. Conditions being favorable for speed, it often sweeps along at a mile-a-minute clip, its tail gliding and its nose lifted in the air. Except for the fact that it doesn't fly, it might be described as a flying ice boat. With a pair of runners in front and a single one behind, it consists essentially of a light frame supporting a monoplane and a 30-hp. motor with aerial propeller connected.

AUTOS NOW CARRY MAIL IN MADRAS, INDIA

Motor cars have recently supplanted horses in the postal service in Madras, India. A preliminary test, in which three trucks were substituted for the old vans, proved so successful that the entire horse service, which included 47 animals, was abolished. This is said to be the first experiment of the kind in India. In addition to effecting a considerable financial saving for the government, reports state that the time of transit in carrying mails between offices has been greatly reduced.

EMERY WHEELS ARE FITTED WITH EYE PROTECTORS

Glass shields have been mounted over the emery wheels in a certain machine shop so as to protect the eyes of workmen from flying sparks and particles of metal. The panes are held in



Transparent Screens Mounted above Emery Wheels for the Protection of Workmen Who Are without Goggles

wooden frames, 8 by 10 in. in size, which are adjustably supported so that they may be lowered as the wheels are worn down.

A VARIETY OF ATTRACTIVE OUTDOOR FEATURES

Something Decidedly Novel in Cages for White Mice is Shown Herewith in Two Views. The Trees are Encircled with Wire Netting Held Out from the Trunks by an Iron Frame. Nesting Places have been Provided within the Inclosure. The Little Creatures Seem to Enjoy Their Outdoor Homes Thoroughly

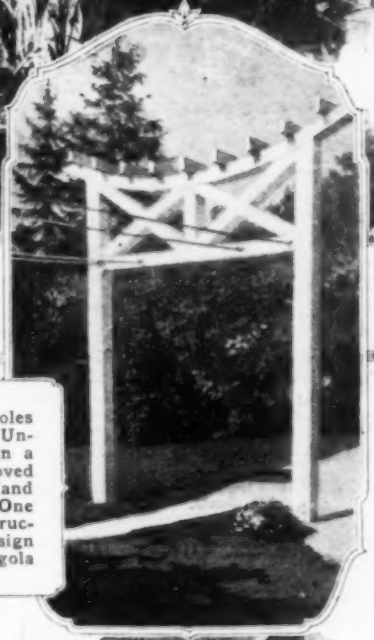
An Old-Fashioned Well in a California Yard, Reminiscent of Home Scenes "Back East": The Whole Structure and the Bucket Are of Concrete. City Water Keeps the Well Chamber Filled with Fresh Water

The Concrete Stepping Stone at the Right, Built for the Convenience of Carriage Passengers, Has a Mail Box Cast in the End of the Second Step, Where It can be Easily Reached by Both the Carrier and the Owner. When Locked It Is Practically Thief-Proof

Loyal to His Native Land, the Irish-American Owning This Handsome Pool has Built It in the Shape of a Shamrock. It is Inclosed by a Sunken Path Which is Approached by a Flight of Steps Leading from the Lawn. Four Metal Frogs Spout Streams into the Pool Continually. The Water Is About Three Feet Deep and Contains Many Handsome Goldfish and Other Aquatic Creatures

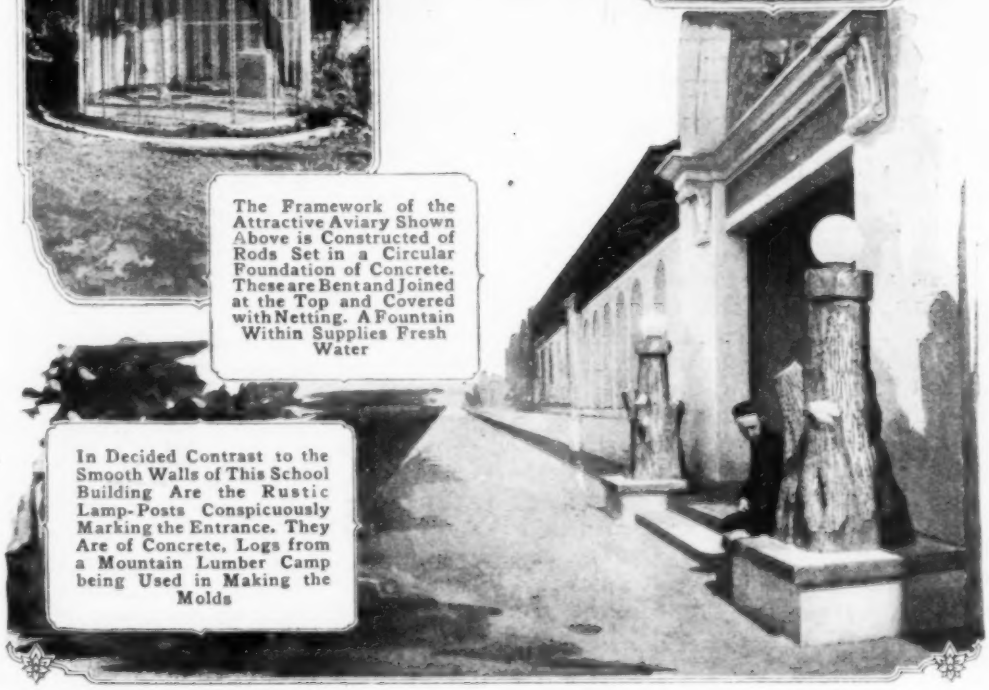
SUGGESTING NEW WAYS TO BEAUTIFY THE YARD

This Handsome Garden Ornament Is a Maidenhair-Fern Ball, in the Center of Which Is a Mexican "Olla." The Olla Is a Water Jar of Porous Material through Which Enough Water Seeps to Permit Constant Evaporation. Such Jars are Made to Use as Drinking-Water Coolers, but This One Serves to Keep the Ferns Refreshed



That Clothes Poles Need Not Be Unsightly Objects in a Back Yard is Proved by the Right-Hand Picture Showing One of a Pair of Structures Whose Design Suggests a Pergola

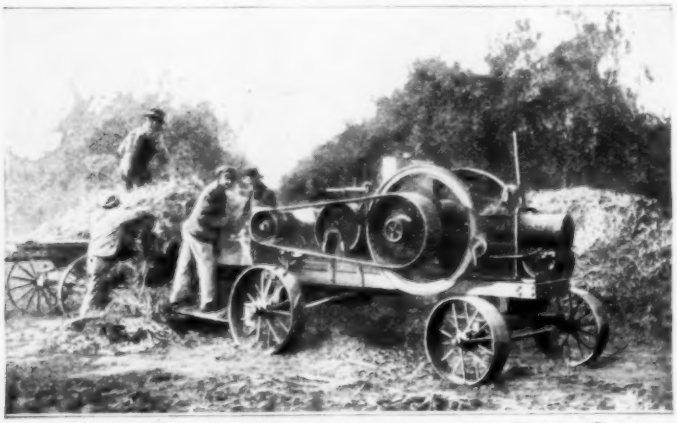
The Framework of the Attractive Aviary Shown Above is Constructed of Rods Set in a Circular Foundation of Concrete. These are Bent and Joined at the Top and Covered with Netting. A Fountain Within Supplies Fresh Water



In Decided Contrast to the Smooth Walls of This School Building Are the Rustic Lamp-Posts Conspicuously Marking the Entrance. They Are of Concrete, Logs from a Mountain Lumber Camp being Used in Making the Molds

OLIVE-WOOD PULP IS USED AS SOIL MANURE

After pruning his trees a Pacific-coast olive grower collects the amputated branches and runs them through an alfalfa chopper. When the resulting pulp is plowed into the ground it adds organic matter to the soil, keeps the latter from packing, and also retains moisture after irrigation. Large quantities of the mulch are used in this manner annually.



Grinding Olive Wood into Pulp Preparatory to Plowing It under the Soil around the Trees

MAY TUNNEL UNDER FIRTH BY MINING FOR COAL

It has been proposed to construct a railway tunnel under the Firth of Forth, Scotland, paralleling the famous bridge now spanning that body of water, and to pay for the tunnel by making it largely a coal-mining proposition. Mining engineers point out that coal is now being mined on both sides of the firth from the same seams and that much of this excavating is done under water. At this point the estuary is only about two miles wide and it is contended that a continuous passage could be made beneath it by properly coördinating the mining operations. In this way what would otherwise probably prove to be too costly an improvement could be made with profit.

FLAT FEET ARE OVERCOME BY PROPER EXERCISES

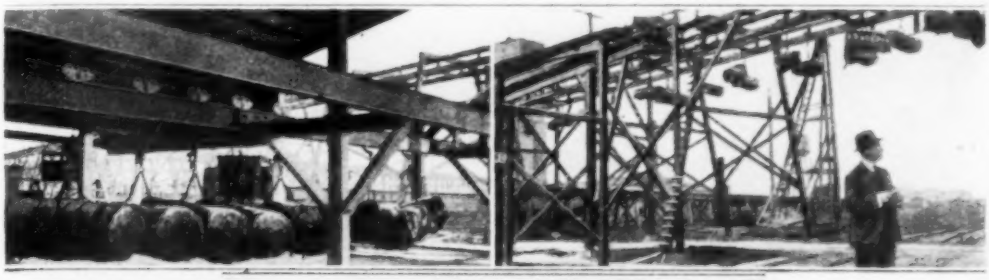
Flat feet can be remedied by observing a few simple practices and exercises, according to examining physicians of the marine corps. For instance: At all times, when exercising, turn the toes inward. When walking, both feet should be held in a straight line. Stand pigeon-toed and raise the body gradually as high as is possible. Then rest briefly with weight on toes before gradually bringing heels back to the floor. Remove the shoes and walk pigeon-toed with weight on toes. Cross legs and allow feet to rest on outer sides when sitting. Arch supporters should be eliminated and broad-toed shoes worn.

TWIN-TIRE NONSKID BELT NEW MOTOR ACCESSORY

To prevent heavy commercial vehicles from skidding, a friction belt composed of renewable segments has been devised. It fits smoothly in the groove between the two bearing surfaces and has enough looseness to permit it to creep, thereby protecting the tires from injury. It is understood to have proved efficient in actual use.

¶An English railway has recently completed, for use in France, an ambulance train composed of 16 coaches, which is 961 ft. long, exclusive of the engine. The train was constructed in 15 weeks.

MONORAIL SYSTEM HANDLES COTTON BALES RAPIDLY



Low Monorails along Which Suspended Bales are Pushed by Workers Standing About 200 Feet Apart

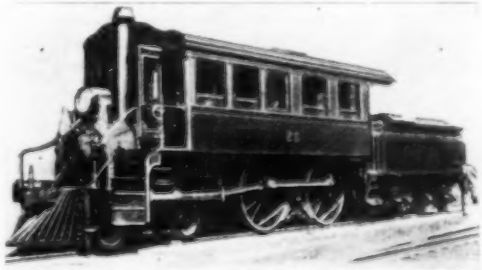
An Incline up Which Loaded Trolleys are Carried to the High Line and Then Moved Along by Pushers Attached to an Endless Chain

Bales being Carried along the High Line at the Rate of 600 per Hour. The Structure Is About 34 Feet High

A particularly efficient monorail system has been installed in connection with a group of cotton warehouses for the purpose of easily and quickly handling large quantities of cotton bales, the carriers being employed to transfer the bales from compresses to warehouses and a shipping dock. In the various buildings from which the weighty bundles are removed are branch monorails, situated 7 ft. above the floor, on which trolleys are shunted as needed. The bales are suspended from them by chains and then shoved along by men who stand about 200 feet apart, giving each bale a push as it passes. On leaving the building the trolleys are drawn up an incline to the "high rail" supported on a trestle 34 ft. above the ground. Here a motor-driven endless chain, equipped every 10 ft. with projecting pushers, moves the trolleys along toward their destination, which may be as much as 1,200 ft. distant. With this equipment 600 bales can be delivered per hour. Unloaded trolleys are brought back by the endless chain.

ODD APPEARANCE PRESENTED BY INSPECTION ENGINE

Of possible interest to many persons who are unfamiliar with railway equipment of this character, is an inspection locomotive operated on one of the eastern lines. It consists of a small engine that carries an elongated cab on its back. This cab is divided into two compartments. The forward one of these is finished much like a parlor car and furnished with wicker chairs for the convenience of officials. Engineer and fireman occupy the rear section. Entrance to the coach is afforded by steel steps at the forward end.



The Forward Compartment of the Long Cab is Finished Like a Parlor Car for the Convenience of Officials on Tours of Inspection

TURNING A TRENCH AROUND

THE best thing an infantryman does is dig. He learns to dig quickly, to dig frantically but efficiently, for many times during a year in the trenches his shovel saves his life, and the ground he has won at the risk of his life.

This is best illustrated in the case of a successful attack. Let us say that four waves of this attack have occupied a set of four front-line trenches formerly held by the Germans.

The first wave, after it has subdued, exterminated, or captured all of the Huns in the first trench, can "take it easy." The process of changing the big ditch into an east-facer instead of a west-facer must be completed in an hour or so, but an hour means "cushy" work for the privates.

The second wave with its second trench is a little more in a hurry. Half an hour usually is allotted for refacing this.

The third wave is still more in a hurry; ten minutes are given the pick and shovel men.

The fourth trench—the last to be taken—is where the real scene of activity ensues. One second wasted may mean a hundred lives lost.

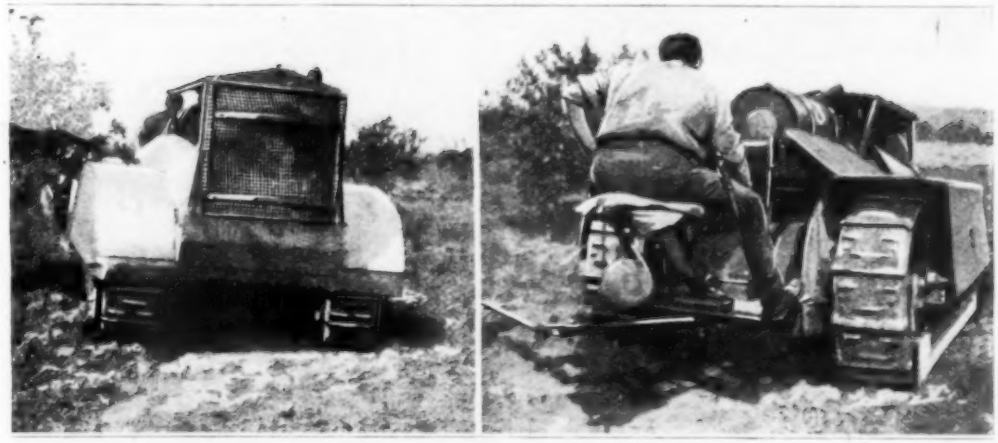
The reason for this rush is that it is now a maxim of the fighting on the western front that a counterattack may reasonably be expected within five minutes after a set of trenches has been taken—certainly within ten. The enemy, in making a counterattack, naturally hits first at the trench nearest him, which is the fourth one captured in the successful attack. Therefore it is vitally necessary to face the parapet the other way, pile up the sandbags, piles, and other obstructions, for breastworks, throw up barbed wire and fasten it to a tangle of stakes if time allows, and generally transform what has been the enemy's fourth line of defense into a new first-line trench ready to repel an attack.

The problem is a huge one. This can be seen readily because the back of the trench—becoming the front—is totally undefended. Broad traverses lead out directly toward the enemy, and often stairways are cut for his convenience, while everything possible has been done to make transit from the other direction impossible. The new defenders are in the position practically of having locked the door which leads back to their own reserves and resources, and thrown wide the door in front for the enemy to enter.

Five minutes' time makes makeshifts necessary; time enough to prepare dugouts for a prolonged stay after Fritz has finally conceded the ground as lost. The first thing done is the blocking of the traverses leading toward the Germans. This calls for some quick blasting of the wall upon which stood the old parapet. The spaces are filled up with this loose dirt, supplemented by bags of rocks, sand, and whatever may be lying about loose.

Then the men throw up a shield of earth, if time presses, and provide spots for the machine gunners which will give these good vantage points from which to work. These men and the sentinels are posted, and then the serious work of excavating to a different level begins. The firing ladders are torn down and refixed against the opposite walls, traverses are run back to the other trenches—those of the Germans usually possess serious defects in the eyes of engineers—and the whole starts to take shape again. The infantrymen have been digging like wild men ever since the last German was accounted for, but this is about as far as they get. The attack comes, and the temporary fortifications either hold or fall. If they hold, then the trench is secure, and work becomes more leisurely though no less in earnest.

¶ According to a paper read at a recent national convention of paint manufacturers and allied interests, oil made from sunflower seed can be used as a satisfactory substitute for linseed oil.



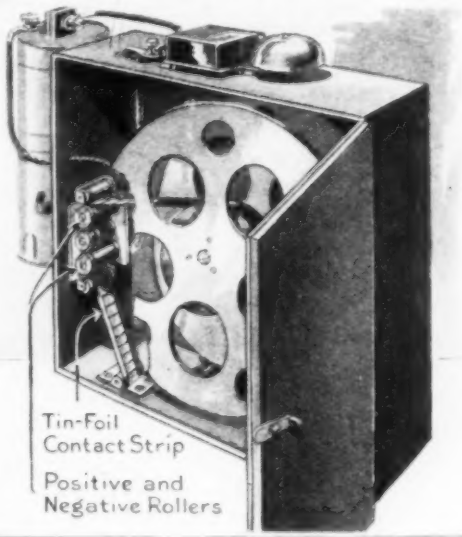
Front View of a Low Tractor Used to Cultivate a 500-Acre Orchard; The "Armor" Prevents Limbs of Trees from being Caught in the Machinery. Right: Rear View of "Armored" Tractor Showing the Endless-Belt Tread

"ARMORED" TRACTOR USED TO TILL ORCHARD

While quite warlike in appearance, the tractor shown herewith is used strictly for peaceful pursuits, being one of five machines employed in cultivating a 500-acre orchard. The endless-belt treads enable it to travel over ground that is still very moist. Though the machines are built especially low, it has been found advisable to inclose the treads and the upper part of the body in a sheet-metal case so that low-hanging branches will not become caught in the machinery. The radiator, which often gets very hot and could easily damage fruit rubbing against it, is covered with a heavy screen.

SIGNAL ASSISTS OPERATOR OF MOVIE PROJECTORS

For the benefit of moving-picture operators an electric signal has been devised which gives warning when the end of a film is approached, and indicates the proper time to change projectors and avoid an interruption on the screen. The contrivance consists, in part, of a frame holding a series of rollers between which the film is threaded. It is mounted inside of the magazine. A pair of the rollers is connected to a battery and bell. Two narrow strips of tin foil, or some similar material, 8 or 10 in. in length, are cemented to one margin of the film. The first is attached about 25 ft. from the end, and the other at the point projection should cease. When either of them comes in contact with the two conductor rollers a circuit is formed and the gong rung. The initial signal is a warning, while the following one indicates that it is time to cut in the second projector.



When Either of the Strips of Tin Foil Comes in Contact with the Two Conductor Rollers, the Bell Signals the Operator

EDITORIAL ILLUSTRATED WITH VIEW OF CASKET

Under the heading "This Editorial is Published for Just One Man to See," the Seattle Star recently departed from

THIS EDITORIAL IS PUBLISHED FOR JUST ONE MAN TO SEE

Somewhere in Seattle there is a motorcyclist who will be interested in this photograph.

It is a picture of a child's casket. Under the white cover reclines the little body of the girl he killed.

Last Wednesday six-year-old Cora Middleton was going across the street, on Phinney ave. Down upon her rushed a speeding motorcycle. It struck her to the pavement and sped on. The rider did not even stop.

So now, Reckless Rider, wherever you are in this great city, look upon your work.

And look, too, you other riders who hurl madly along the streets with never a thought for city ordinances.

Look, you policemen who permit them to do it.

THE EVERLASTING TRIBUTES TO THESE SPEED-MAD DEVILS ARE THE GRAVES OF LITTLE CHILDREN AND THE TORN HEARTS OF MOTHERS.

newspaper tradition and printed an illustrated editorial. It was a stinging rebuke for a certain reckless motorcyclist whose name was not known. In a few words it told how a little girl had been killed by the speeding driver, who did not stop to pick up the child he struck down. The picture accompanying the editorial was a photograph of the casket in which the child was buried.

GOVERNMENT ESTABLISHES A NITRATE PLANT

Announcement has been made by the War Department that preparations are under way for the establishment of a Federal nitrate plant at Sheffield, Va. It is expected also that the proposed new government powder mill will be erected near by. Recommendations formulated by a special investigating committee charged with the duty of "determining the best, cheapest, and most available means for the production of nitrates," are being followed. A special commercial process employed by a domestic chemical company is to be used. By it, nitric acid is obtained through the oxidation of ammonia. Steps have been taken to provide machinery and materials for a synthetic ammonia plant of 60,000-lb. daily capacity and an oxidation plant capable of producing 24,000 lb. of 100-per-cent nitric acid a day.

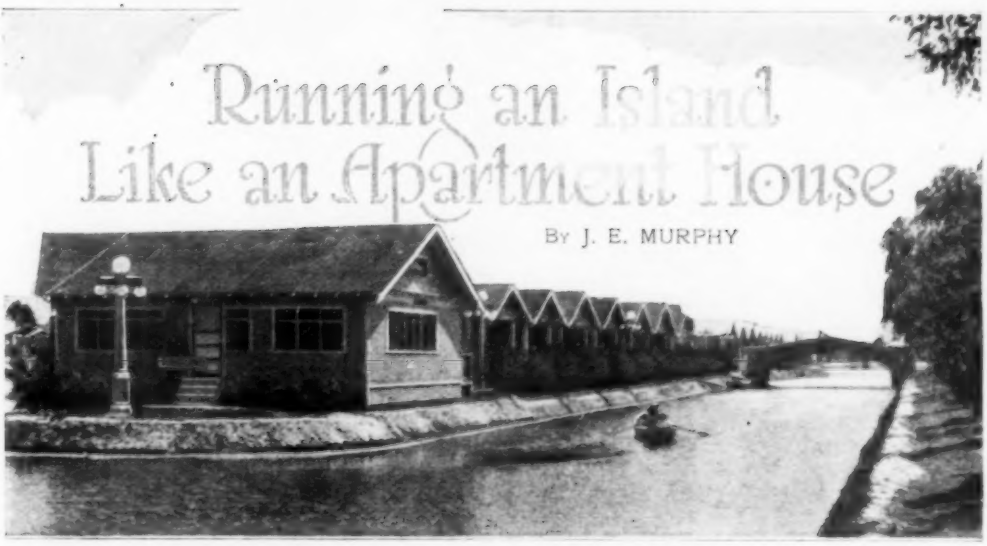
Nitrogen is one of the most widely diffused elementary substances. In its free state it is a colorless, tasteless, nonodorous, and inert gas. It is neither capable of combustion nor is a supporter of combustion and has very slight combining powers. It comprises about four-fifths of the bulk of the atmosphere and is almost invariably present in soils. When united with certain other substances, it forms unstable compounds that are of great value in the manufacture of high explosives. An example of this is found in nitroglycerin.

The presence of nitrogenous compounds in the ground, except in the case of large natural deposits, is due to the action of nitrifying bacteria. They are absolutely indispensable to plant life and are absorbed by growing vegetation. Soil fertility therefore depends upon continual replacement of the amount abstracted and this natural law is responsible for the universal need of nitrogen fertilizers. There also are certain crops that take nitrogen from the atmosphere and leave the surface soil richer in the element than it was before they were planted. Herein lies the value of scientific crop rotation.

In combined states, nitrogen is found in niter, Chile saltpeter, ammonium salts, and various animal and vegetable liquids. It may be obtained from the atmosphere by the removal of the oxygen and other elements with which it is mixed. This is one of the common laboratory methods, and for some time, through the employment of electrolytic and fixation processes, it has been used commercially in Europe and Japan.

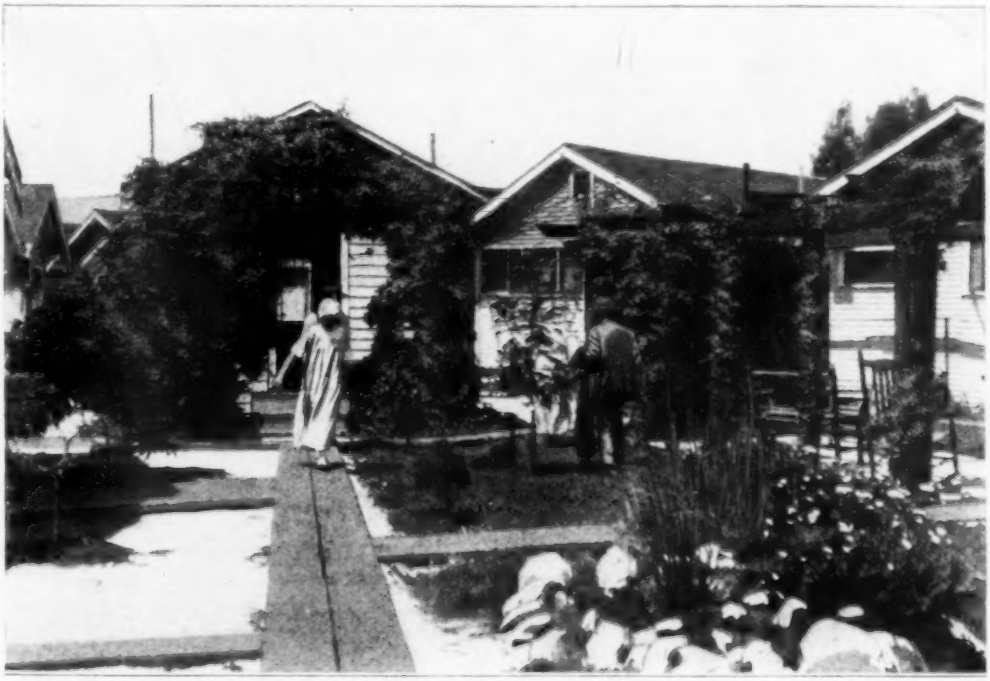
Running an Island Like an Apartment House

By J. E. MURPHY

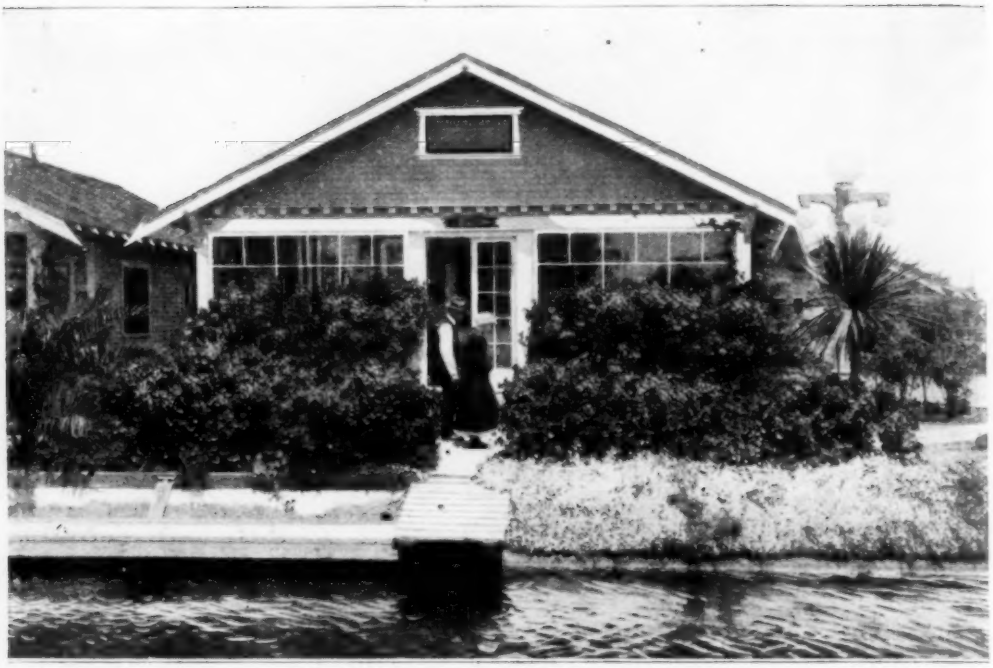


Looking down the Altair Canal toward the "Venetian" Bridge That Carries All of the Vehicular Traffic to and from the Island: The Bungalows Front on the Water and the Banks are Covered with Shrubbery

TUCKED away in the heart of the picturesque canal district of Venice, Calif., is an island that is locally famous because of its novel features, although it is situated in a section of country where the unusual is so prevalent that novelty is regarded as the commonplace thing. Here the apartment-house idea has apparently attained its full growth, the 34 bungalows for which the island furnishes a site being handled as a unit in exactly the same way as the apartments of a city building. A well-equipped laun-



Straight Ahead at the End of the Plank Walk Is the Community Laundry, While in the Mass of Vines at the End of the Pergola Stands the Sewing Cabin, Which is Completely Equipped and Conveniently Arranged



Instead of Bearing a Number, Each Bungalow is Named after Some State. This One, for Instance, Is "Maine"; Therefore the Unusual Little Isle of Homes is Fittingly Known as the "United States Island"

dry and the other facilities, considered indispensable by flat dwellers, are provided, with the difference, however, that none of these service features are located in the basement. Incidentally, it may be mentioned that there is no such thing as a basement on the entire island. The "street-numbering" system is as unique as the organization of community service. Each bungalow has a plate over the door bearing the name of a state, and these state names are used, instead of street numbers, for distinguishing the individual bungalows. Hence the name, United States Island.

The island has an area of about two acres and is bounded by three canals—the Altair, Lion, and Cabrillo. Originally the idea was to make it a unique and attractive center for tourists. It proved too popular, however, to be reserved for transients, and all the bungalows are now occupied by permanent residents. As is the custom in southern California, these little homes are rented furnished, the typical bungalow comprising a living room, dining room, one bedroom, and kitchenette. The bungalows are placed along the shores of the canals. Each has its boat landing, a number of rowboats being supplied free for the use of the tenants. Bordering the canals are beds of flowering plants so chosen and arranged that there are masses of blooms at all seasons of the year.

The Community Grocery, an Attractive Bungalow Store with Clean Floors and Bright Windows, Where Islanders Do Their Trading

The island is intersected by a street which makes the canal crossings by means of the

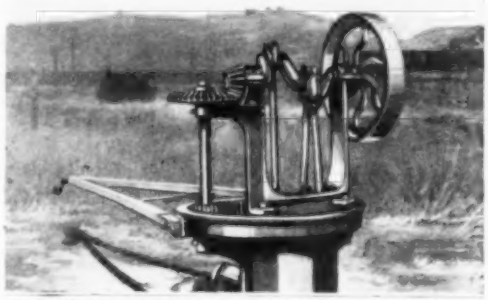
quaint "Venetian" bridges common to the canal district. On this street are the community garage and the grocery. The laundry is a roomy, vine-covered building placed in the middle of the island and provided with up-to-date equipment such as electric washing machines and electric irons. Adjacent to this building are the sewing cabin, equipped with two machines, and the community clothes-drying yard, the latter, owing to the compact arrangement of lines, being capable of taking care of the family "wash," all at the same time, from six or eight of the bungalows.

DOUBLE-DECK CARS CARRY LARGE OR SMALL STOCK

There is now in service on various railway lines in this country a stock car having an adjustable deck which doubles the car's capacity for carrying small animals. The improvement may be regarded as one of special value at this time when there is a serious shortage of freight cars of all kinds. The deck may be raised or lowered by means of chains and a winding shaft, the latter being located at the side about level with the stationary floor. When let down, the deck divides the car into two compartments, each 43 in. high and capable of carrying hogs or other small live stock. The single compartment obtained by raising the upper floor is 82 in. high and is ample for the transportation of larger stock, such as horses and cattle.

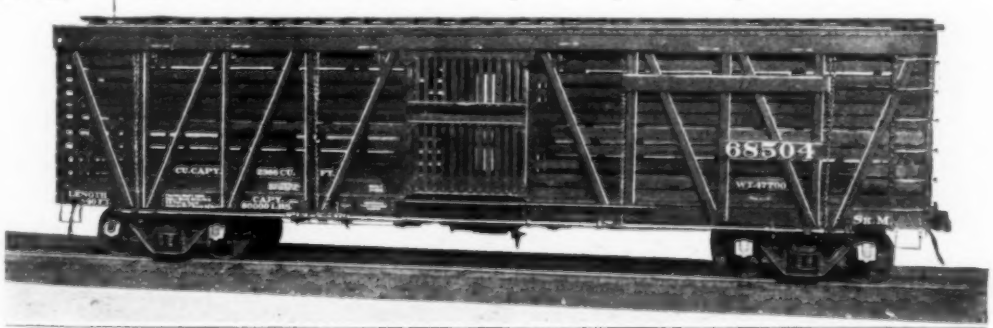
HORSE OPERATES A PUMP USED IN ROAD MAKING

The use of horsepower for pumping is now so much less common than the use of gasoline engines for that purpose that the outfit employed in securing water from a marsh, in connection with a job of road making, is something of a novelty. The horse operating this pump travels in a circle, being hitched to a beam projecting from an annular iron base which is cogged on the inner face. As the base revolves it actuates gearing, which in turn operates pump pistons by means of a crankshaft.

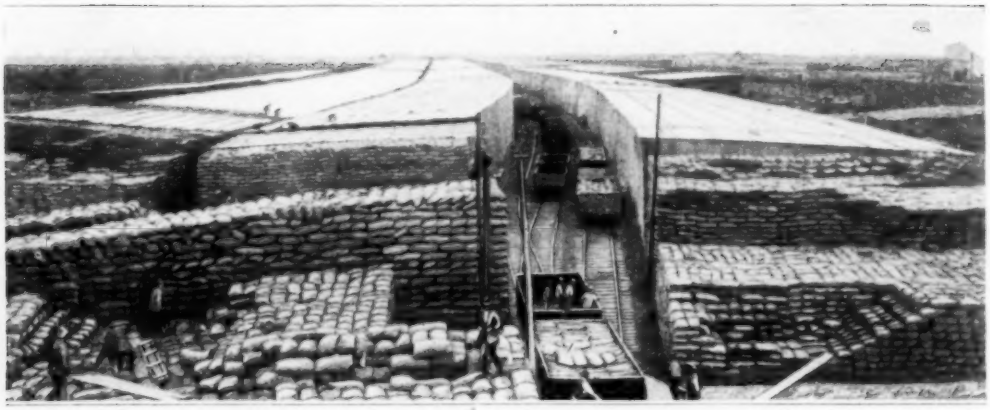


Horse-Operated Pump Employed in Drawing Water from a Near-By Marsh to Fill Water Carts and to Use in Mixing Concrete

A Navy Department order, issued to prevent the possibility of mines being sowed along our coast, forbids foreign vessels sailing from an American port excepting between 8 a. m. and 4 p. m., and then such vessels must be accompanied by a coast-patrol boat.



Stock Car Having an Adjustable Deck with Which the Carrier can be Divided into Two Compartments 43 Inches High: The Hoisting Chains and Winding Shaft are Shown, the Latter Being About Level with the Lower Floor

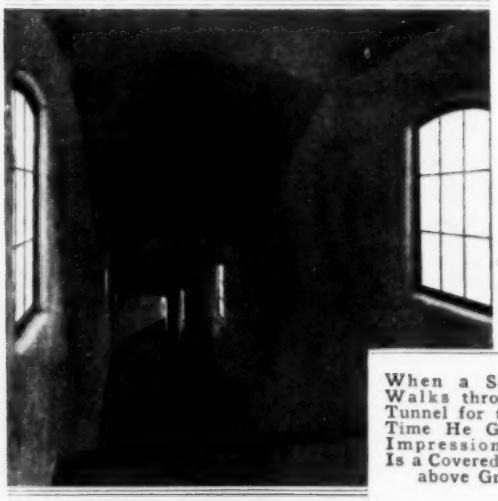


WHEAT ENOUGH FOR MILLIONS IN ONE PILE

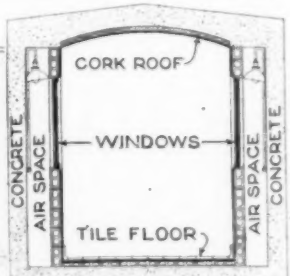
HERE is food enough for a nation—7,000,000 bags containing 21,000,000 bushels of wheat! This remarkable photograph was taken at Brooklyn, near Melbourne, Australia, and shows how the government there has cared for that portion of the grain harvest which cannot be sent overseas because ships are not available. The stack has been piled with great care so that it is very well drained and practically all of it has been roofed with galvanized iron, which covering can be seen stretching far into the background.

REMARKABLE ILLUMINATION OF UNDERGROUND BORE

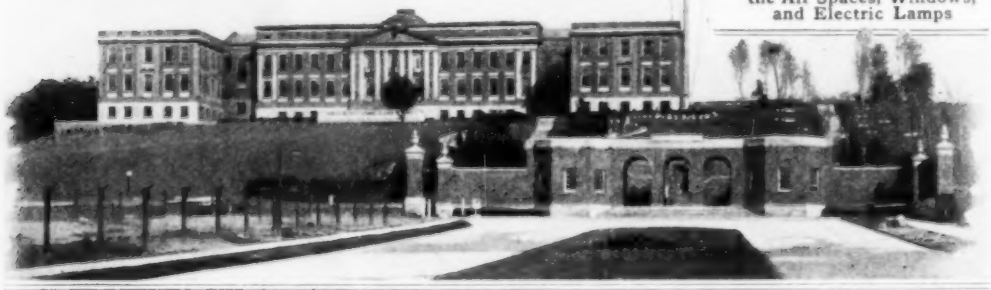
To the casual observer a subterranean passage, providing access to the laboratories and general offices of a plant situated on a high knoll at Cleveland, Ohio, is sunlighted. It is only



When a Stranger Walks through the Tunnel for the First Time He Gains the Impression that It Is a Covered Passage above Ground



Showing the Arrangement of the Air Spaces, Windows, and Electric Lamps

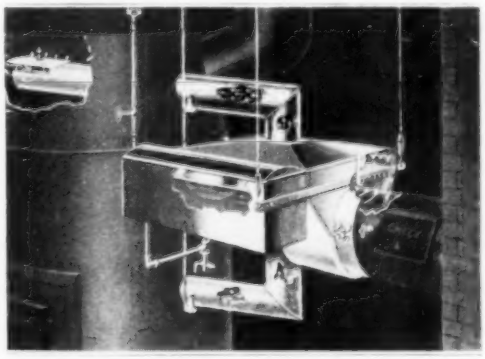


The Tunnel Gives Access to the Buildings on Top of the Knoll and is Used during the Winter Months When Snow and Ice Make the Long Flight of Hillside Steps Inconvenient and Dangerous

when a stranger fully realizes that the passage is a tunnel that the significance of its illumination becomes apparent. By ingenious engineering, electric lamps have been made to banish the dingy atmosphere that usually pervades such places and give the passage the appearance, to one inside it, of being above, rather than below, the ground. Narrow air vaults, provided at intervals on both sides and reaching the full height of the tunnel, occupy the space between the outer concrete and the inner tile walls. They are sealed by windows of translucent glass behind which, at the top, are mounted 100-watt blue-glass lamps in display-window reflectors that direct the rays through the panes. The result is considered a real triumph in artificial illumination.

SELF-OPERATING HUMIDIFIER FOR HOT-AIR FURNACE

To moisten properly the atmosphere in residences heated by hot-air plants, a humidifier that is installed in the smoke pipe, so that it utilizes heat that otherwise would be wasted, has been introduced. It discharges large quantities of warm vapor into the furnace dome and distributes it to the various pipes. The reservoir is connected with a service pipe and the flow of water



The Installation of the Humidifier is Made between the Furnace and Check Valve. No Attention is Required Aside from Occasional Regulation

controlled by a float valve. The apparatus may be regulated from the living rooms.

AUTO ENGINE DRIVES NEW MONORAIL ORE CARRIER

For the purpose of hauling ore concentrates from a mine to a railway some two miles distant, at low cost, a

Monorail Car, Equipped with a Low-Priced Automobile Engine, Which Is Capable of Carrying Three Tons of Ore

mining company has undertaken the construction of a monorail track on which is driven a special car equipped with a low-priced automobile engine. Two double-flanged wheels support the powered car, while at either side is a hanging carrier with a capacity of one and one-half tons of ore—an arrangement that brings the center of gravity well below the rail. Guide wheels on the sides of the carriers help to keep the whole vehicle steady. According to the mining company, the car can be built for $600 and is capable of mounting a 10-per-cent grade.

AERIAL POST TO SARDINIA SUCCESSFUL VENTURE

Submarines and inclement weather no longer interfere with the mail service between Sardinia and the Italian mainland. For six months aerial transmission has been employed. The trip, formerly an uncertain one, of a day's duration, by steamer, is made rain or shine by aeroplane in about two hours' time.

¶ It has been announced that hereafter an old tannery in Pittsburgh is to be used exclusively in handling fish skins and that the establishment will be able to take care of 150 skins daily.

BUILDING AND PLACING CEMENT-COATED FORM

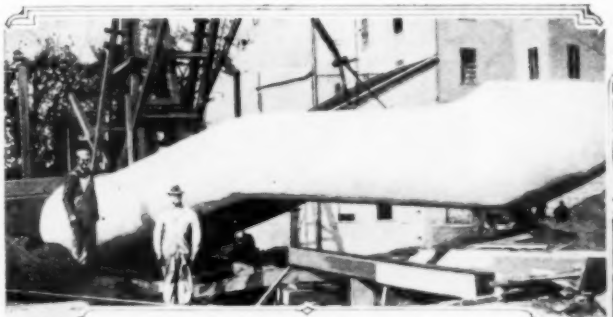
Transverse Sections of a Form Used in Making a Concrete Draft Tube for a Turbine: The Size of the Tube can be Estimated by Comparing the Top Section with the Height of the Man Holding It

What Resembles the Skeleton of Some Huge Prehistoric Monster is Composed of the Wooden Sections Shown at the Left. This Is the Framework of a Form Used in Building an Outlet Extending from a Turbine Wheel to a Point below the Level of the Tail-Water

The Big Form Partly Lathed: When the Placing of the Circular and Oval Sections was Completed, the Entire Surface was Covered with Laths Preparatory to Coating It with Plaster. Care was Taken to Make the Interior Strong, so That the Form could Hold Its Own Weight When It was Lowered into Place by Means of a Crane and Other Moving Apparatus

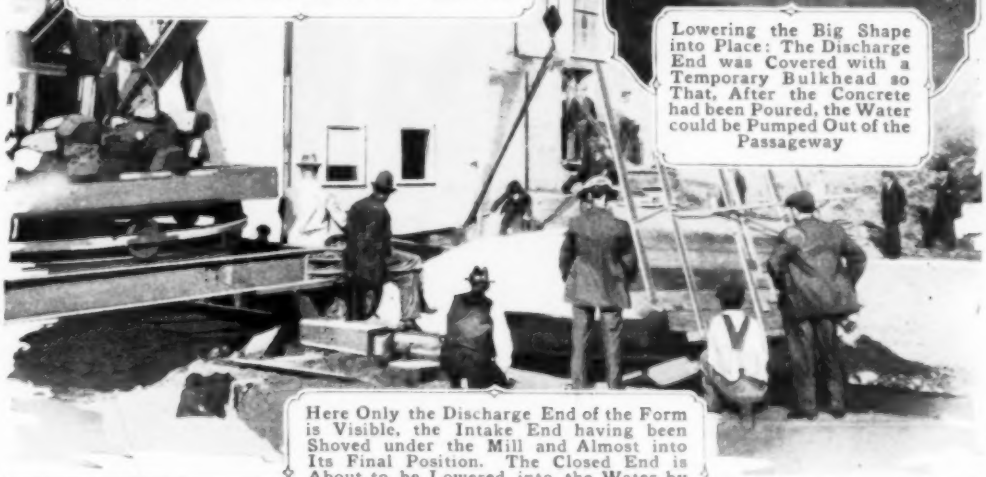
Covering the Wooden Form with Cement Plaster: This Rather Unusual Method of Finishing a Concrete Form Gave It a Smooth Surface Which was Reproduced on the Concrete Poured around It. When the Concrete had Set the Proper Length of Time, the Lumber and the Cement Coating were Both Removed. The Discharge End is Here Shown in the Foreground

OF CONCRETE DRAFT TUBE FOR MILL TURBINE

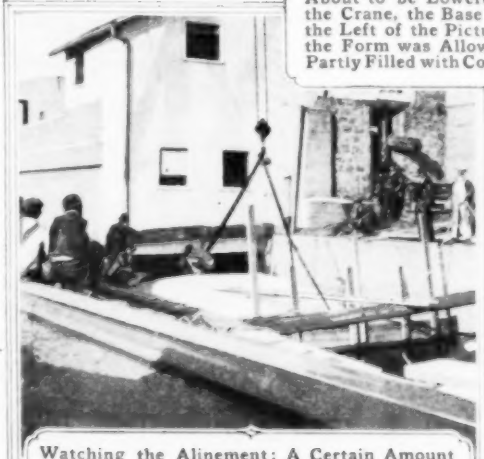


The Draft-Tube Form Completed: After Giving It a Coating of Cement Plaster the Entire Surface was Whitewashed so that This "Skin" would Not Adhere to the Concrete to be Filled In around It, but could be Removed with the Lumber and Lath that Formed the Framework

Lowering the Big Shape into Place: The Discharge End was Covered with a Temporary Bulkhead so That, After the Concrete had been Poured, the Water could be Pumped Out of the Passageway



Here Only the Discharge End of the Form is Visible, the Intake End having been Shoved under the Mill and Almost into Its Final Position. The Closed End is About to be Lowered into the Water by the Crane, the Base of Which is Shown at the Left of the Picture. The Pit in Which the Form was Allowed to Rest was Later Partly Filled with Concrete as Shown Below



Watching the Alinement: A Certain Amount of Water was Allowed to Enter the Tube through a Gate in the Bulkhead so That the Form would Submerge. Except for the Lowering of the Discharge End the Big Cylindrical Shape, as Shown Here, Is Almost in Place. The Next Step was to Incase the Tubelike Unit in Concrete

The Task Completed: The Concrete Poured around the Big Form Makes a Solid Block with a Curved Passageway from the Turbine Wheel. The Outlet for the Tube Is About a Foot below the Surface of the Water in the Pit. The Installation of This New Tube in a Clinton, Michigan, Mill Increased the Efficiency of the Old Wheel by 60 Horsepower

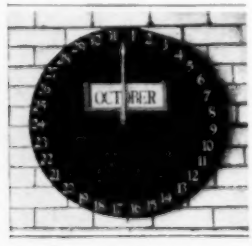
PAINTED BARRELS RECEIVE GIFTS TO "SMOKES" FUND

In Kansas City the "drive" to secure tobacco for our soldiers was helped materially by placing barrels, painted red, white, and blue, in various stores to receive contributions. Many persons gave cash as well as "smokes."

A European professor is reported to have invented a new feedstuff for stock and a machine that will produce it at the rate of 20 tons per day. The feed is composed of albumen and fats from slaughter houses and fishing centers, starch from potato and fruit refuse, and salt from refuse of vegetables.

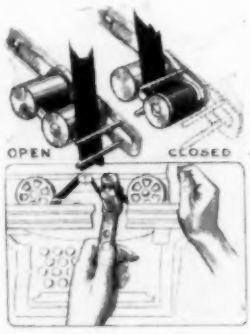
SAFETY-FIRST CLOCK USED TO PROMOTE CAREFULNESS

At the main entrance of a large printing plant where hundreds of men and girls are employed, a "safety clock" has been installed. The days of the month are represented numerically on its face and each day that no accident is reported the indicator is moved forward one point. When an injury is incurred, the hand remains stationary for a 24-hour period. The object, of course, is to so instill safety-first principles in the minds of the workers that accidents will be largely eliminated. In addition to the clock, announcement cards are posted on the various floors of the plant. A red placard indicates that some employe was injured, a green one that no accident occurred, on the previous day. These and other measures have been taken by the company's safety-first committee in a campaign against avoidable mishaps. Such efforts have reduced the number of personal injuries about one-half.



DEVICE RE-INKS RIBBONS FOR TYPEWRITERS

A simple device is being introduced in business offices which makes a typewriter ribbon serviceable, after wear has removed much of the ink, by re-inking its surface. Mounted on a suitable handle is a little ink reservoir having a wick projecting from its side, which rubs against an adjoining roller. The ribbon to be refreshed is threaded about the roller, between guides, without being removed from the machine, and is then drawn through the device by winding it from one spool to the other. In so doing the roller takes the ink from the wick and transfers it to the ribbon.



STEERING-WHEEL DEVICE FOR MAIMED AUTOIST

Though deprived of one hand, a crippled motorist steers his car without difficulty with the aid of an attachment which enables him to use the stump of his arm in turning the wheel. It consists of an iron strip fashioned into a series of scallops that are bolted to the edge of the wheel, furnishing rests in which the arm can be placed.

SPORTSMAN SEEKING THRILL RIDES SWIMMING MOOSE

The Man Stepped Quickly from the Bow of the Canoe to the Back of the Swimming Moose

Waving His Hat in Cowboy Fashion, He Forced the Puffing Bull to Its Utmost Speed

Grabbing a Firm Hold, He Straddled the Frightened Beast and Began the Unusual Ride

To the unwritten list of unusual outdoor sports may be added moose-back riding in the water. One member of a hunting party that sought big game on Lake Rainy, in Ontario, indulged in this uncommon diversion not long ago and attests that it provides worth-while sensations for one with the nerve to enjoy them. Coming upon a big bull crossing the lake, the party gave chase and a canoe was shot alongside the beast. Acting quickly, the man in the bow stepped from the craft onto the moose's back, took a firm hold of the rear points of the horns, and seated himself astride. Then, waving his hat like a western cow puncher, he spurred the animal to its utmost speed. As the shore was approached, the rider, for safety's sake, slipped into the water and permitted the bull to land unencumbered.

SPECIAL RULES REGULATE TRAFFIC ON DESERT ROAD

To prevent arguments arising between motorists, the state highway commission of California has ruled that northbound traffic shall have the right of way on a concrete road that traverses a stretch of desert near Salton Sea. Except at special turnouts provided at stated intervals, cars cannot readily pass each other without one of them getting into sand that is difficult to negotiate. Therefore when two cars, going in opposite directions, meet on the artery, one of them must back up to the nearest passing point. Signs erected at each end of the highway serve notice of this rule.

Signs Announcing That North-Bound Traffic Has Right of Way across the Desert Stand at Opposite Ends of the "Single-Track" Highway

CALGARY OWNS HANDSOME SIGHT-SEEING CAR

The city of Calgary, Alberta, has shown its enterprise and civic pride by providing a handsome sight-seeing

Municipally Owned Street Car in Which Many Visitors to Calgary are Carried about the City on Sight-Seeing Trips

street car for visitors in which they can be carried over the municipally owned car lines to see various places of local interest. The seats in the car are arranged in tiers, one above the other. A fringed canopy, iron rails, brightly polished fixtures, and mirrors on the sides, all add to the attractive appearance of the car.

ANNUAL CHEESE DAY SHOWS VALUE OF SPECIALIZING

The fourth annual Green County "Cheese Day," which thousands of persons celebrated a few weeks ago at Monroe, Wis., calls attention to the remarkable success enjoyed by residents of that region because they have specialized in one industry—cheese making. At an appointed time during the day cheese sandwiches were given away in the public square and within an hour after distribution began, the supply, consisting of 25,000 sandwiches containing over a ton of Swiss cheese, was exhausted. Green County developed as a great cheese-producing district chiefly because, in 1845, more than one hundred Swiss immigrants, who understood cheese making came to the Middle West in search of a home and finally selected land in this region. Their early years here were marked by great poverty and suffering, but eventually they enjoyed great prosperity.

WATER HEATER WHICH FITS ANY OIL STOVE

A water tank, the plan of which is T-shaped, has been provided with coils and connecting pipes to form a water heater that can be used with any common type of oil stove, without interfering with the latter's use for cooking. The larger portion of the tank corresponds to the crosspiece of the "T" and is deeper than the remaining portion, which is intended to be inserted between two burners. The pipes, of which the coils form a part, connect the ends of the larger chamber with the outer end of the smaller one. When the tank is in place the coils are brought immediately above the adjacent burners. As the water

A Water Heater Designed to be Used with Oil Stoves: It does Not Prevent the Use of the Burners for Cooking

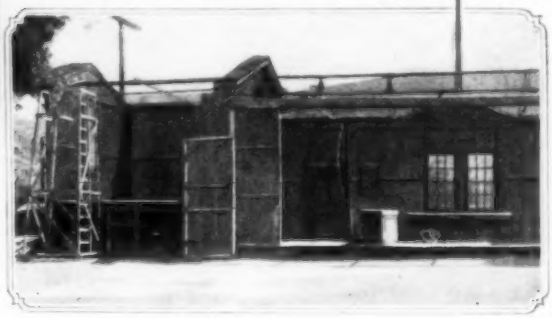
is heated, it rises through the tank and may be drawn off from the faucet located on the front end of the tank.

USE ARABIAN-NIGHT DEPOT IN MAKE-BELIEVE TOWN

Should a traveler unwittingly leave his train and enter the railway depot at a certain point on a western road, he would instantly conclude he was in the town of "Make-Believe." And he would be right, although the place is known by another name. Upon entering the doorway of the waiting room and stepping inside, a stranger would be startled to find himself outdoors with the blue sky overhead and a back yard where the opposite wall seemingly ought to be. The station is listed in the time-tables of an every-day railroad company and the depot is real—on the front side. Since the town is a motion-picture one and its interests best served by scenery, it has a skeleton station. Despite this, it is used as a depot. Passengers and express matter are received and discharged and photoplays filmed there.

The Phantom Depot in the Town of "Make-Believe": A Structure That Looks from the Front Like All Other Small Stations along the Line, but Which in Reality Is Chiefly an Outdoor "Set" for Photoplay Purposes

Filming a Scene in a Railway Scenario before the Depot: Regular Trains Pass Daily, but between Them the Movie Camera Is Usually Busy



Looking at the Roofless Station from the Rear: Despite Its Ventilation the Depot is Used, for Passengers and Express Matter are Received and Discharged There

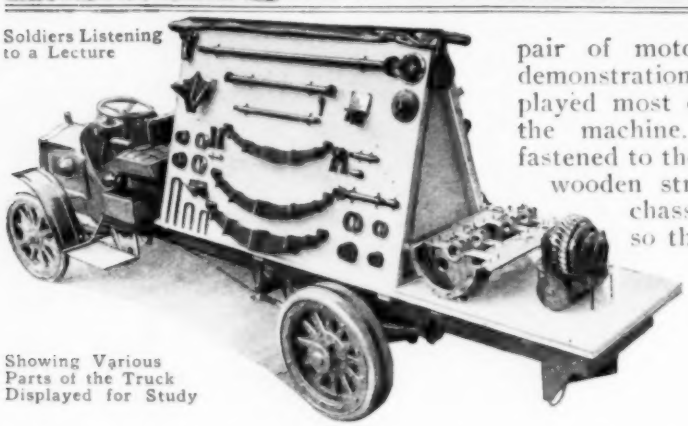
CHEAP FLASH-LIGHT BATTERY IS BEING PRODUCED

Importance is attached to the invention in Switzerland of a new dry battery for electric flash lights that is said to be less expensive and better than those now in use. It is built in three separate parts, any one of which may be replaced by a fresh element when its strength is exhausted. This obviates the waste incident to the present necessity of junking the whole battery when it becomes weak. Despite the exorbitancy of prevailing prices for raw materials, the battery is manufactured abroad at half the cost of those of other types. Factory equipment that in the United States could probably be provided for about $1,800 is said to be capable of producing about 30,000 of the elements, or 10,000 complete batteries, daily. All of the materials employed are available in this country.

¶In the first six and one-half months that have elapsed since the United States entered the war, there were but eight fatalities in connection with the whole training program for America's big air army.

WORKING PARTS OF TRUCK DISPLAYED FOR SOLDIERS

Soldiers Listening to a Lecture

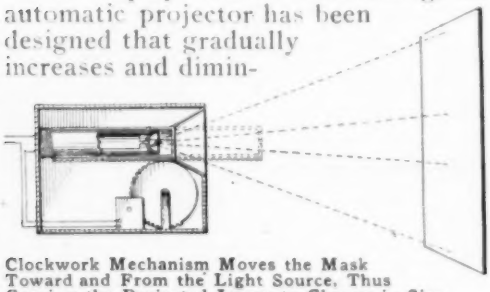


Showing Various Parts of the Truck Displayed for Study

At one of the army training camps where prospective truck drivers are being instructed in the care and repair of motor vehicles, there is a demonstration car on which are displayed most of the working parts of the machine. These members are fastened to the sides of a tent-shaped wooden structure mounted on the chassis and are in plain view so that they can be easily inspected. With this portable layout, a competent mechanician acting as instructor is materially helped in teaching his student soldiers the character of various parts and the methods of reaching, cleaning, adjusting, repairing, or replacing them.

ILLUMINATED SIGN GROWS AND SHRINKS IN SIZE

For display-window advertising, an automatic projector has been designed that gradually increases and diminishes the size of the images or signs it casts on a ground-glass screen. It is the purpose, of course, to attract and hold the attention of pedestrians. The effect is produced by reflecting strong light through a mask held in a mounting that is slowly moved forward and backward by clockwork. The size of the projected image varies inversely with the movement of the mask away from or toward the light source.



Clockwork Mechanism Moves the Mask Toward and From the Light Source, Thus Causing the Projected Image to Change in Size

¶ Cactus candy is a new confection being made in the South, consisting of prepared cactus dipped in hot molasses.

MOVIE FILMS DELIVERED BY AEROPLANE

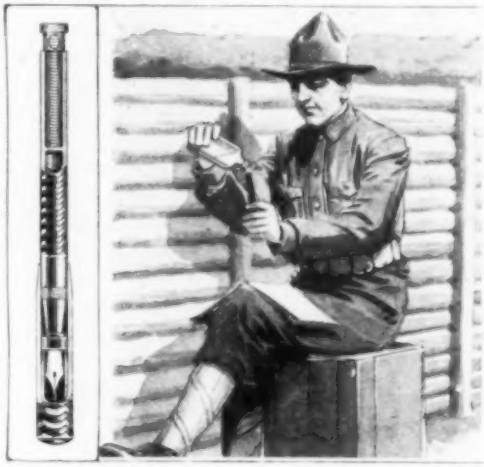
A rather spectacular demonstration of the commercial use to which aeroplanes may be put was given not long ago when an instructor in a flying school carried a five-reel "movie" film from Buffalo to Rochester, a distance of 70 miles, in 45 minutes. The express company which had been relied on to transport the film was unable to deliver it in time, and in order not to disappoint the theater manager in Rochester the air route was resorted to.

PHILIPPINE LOCOMOTIVES FORCED TO BURN WOOD

The coal shortage caused by the war has been felt so keenly in the far-away Philippines that the Philippine Railway has given up using coal in some of its engines and is burning wood instead, even though the cost of the latter is 25 per cent higher than that of the regular fuel, at the old price. Before the war, Japanese coal was obtained for $5 per ton, whereas now it would cost $20. A 50-ton locomotive, loaded with six cords of wood, is able to draw a train 73 miles, the length of one of the railway divisions. With its tender piled high with sticks the appearance of this engine suggests pioneer railroading days in America, when wood was the chief fuel used.

NEW PEN FOR SAMMIES HAS RESERVE INK SUPPLY

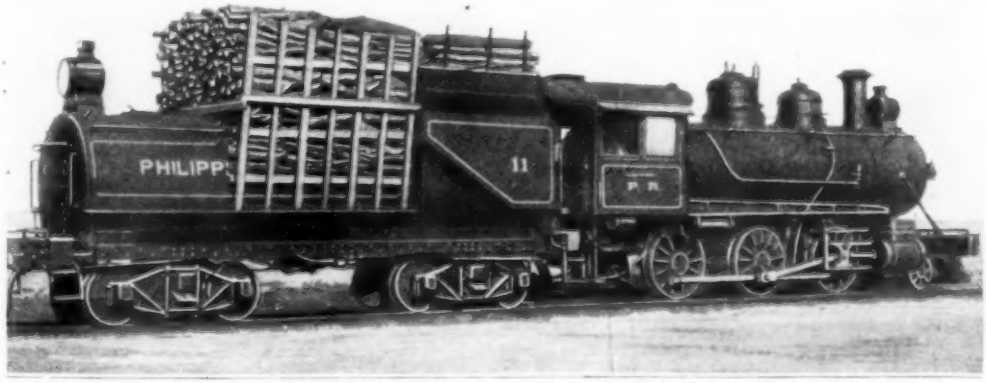
A new fountain pen that is almost sure to make a strong appeal to a soldier because it guarantees him an



A Pen That Is a Boon to the Man in the Trenches: It is Provided with a Chamber Containing Ink Tablets Sufficient for Writing 150 Letters

ample ink supply, is provided with a chamber in which are stored ink tablets sufficient for writing 150 ordinary letters. The pen is made ready for use by pouring water in the fluid-ink chamber and adding one tablet.

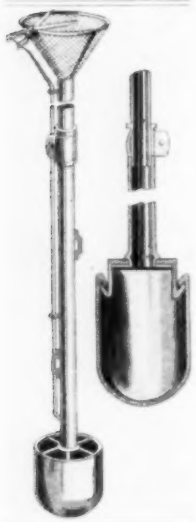
¶ Repairs on the 300-ft. dry dock at Cristobal, Canal Zone, have so decreased the leakage that it can be pumped out in half the time formerly required.



A 50-Ton Philippine Locomotive Which is Using Wood for Fuel Because of the High Price of Coal: The Six-Cord Load Shown Is Sufficient for a 73-Mile Run

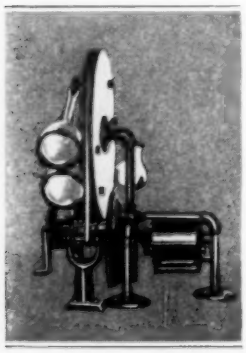
SANITARY FRUIT PICKER REACHES TREE TOPS

Climbing to the top of an unsteady stepladder is now unnecessary if one employs a newly patented device for removing fruit from trees. The device is sanitary as well as convenient in that the user does not touch the fruit. It consists of a long tube having a bag at the lower end and a funnellike wire basket at the upper end. Extending across the mouth of the basket is a pair of shears, kept open by a spring, which are operated by a cord extending down the side of the pipe. Fruit cut from the limbs with the shears falls into the pipe and thence into the bag, which may be emptied as often as necessary. In this way fancy fruit may be handled quickly and without bruising.



BOTTLE-SHAKING MACHINE FOR LABORATORY USE

To save the time and labor involved in shaking bottles containing various solutions, a chief chemist in a filtration plant has installed a mechanical device that does the work for him. It consists of a solid wooden wheel, mounted vertically, to one side of which are fastened two metal holders in which bottles are placed. A belt passes around the wheel and is driven by a small motor.

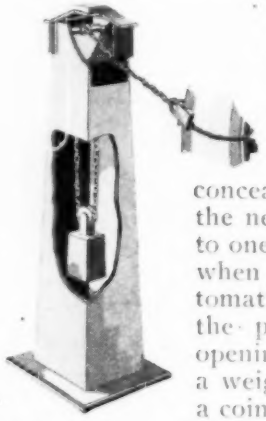


BONA ISLAND LIGHTHOUSE CONNECTED BY PIPE LINE

Of late a pipe line has been laid to the top of Bona Island, Gulf of Panama, to supply the beacon light, maintained there, with gas. The tube connects 18 cylinders joined in series and housed a few feet above high water. They contain a 650-day supply of fuel which is sent through 2,000 ft. of pipe, at a pressure of 250 lb. The danger, trouble, and expense formerly incurred in transporting the cylinders to the top of the island, 685 ft. above the sea, have thus been eliminated.

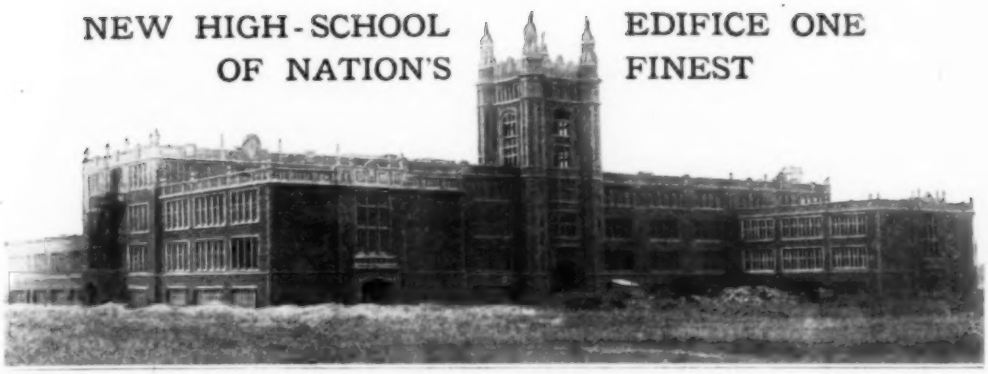
SAFETY LOCK FOR AUTOS IS COIN-OPERATED

The invention of a coin-operated lock may bring the almost discarded hitching post back into service, its new use being to prevent the theft of automobiles. The new hitching equipment consists of a hollow post in which is concealed a chain with the new lock fastened to one end. The chain, when not in use, is automatically drawn into the post, through an opening in the side, by a weight. By pressing a coin into a slot in the lock, a key, which also serves as a claim check, is released. The chain can then be fastened about the car wheel and cannot be removed except by the person having the proper claim check.



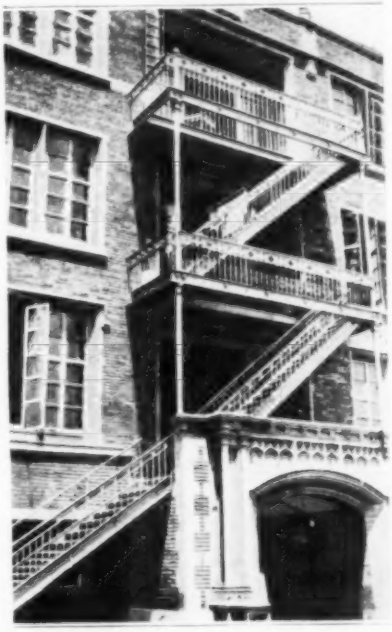
¶Our government is erecting "somewhere in France" a cold-storage warehouse in which 10,000 tons of meat and produce for our soldiers can be kept. Several large packing concerns in this country have coöperated with the government in planning the details of the plant.

NEW HIGH-SCHOOL EDIFICE ONE OF NATION'S FINEST



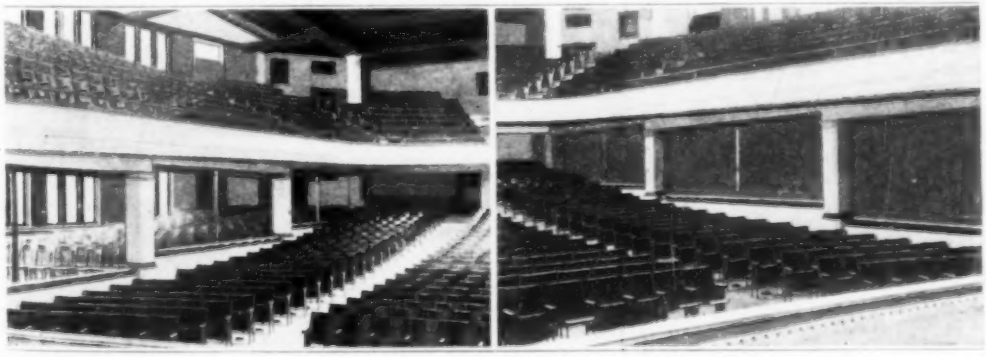
New Los Angeles High-School Building Which Cost $825,000 and in Which Provision has been Made for Practically Every High-School Need

BY reason of its very comprehensive plan, its size, and cost, a new high-school building in Los Angeles takes rank as one of the finest in America. Located in a city block, 940 ft. square and surrounded by spacious lawns and athletic grounds, its excellent proportions and architectural features are splendidly displayed. The structure is built chiefly of brick in the form of the letter "H," the central portion being four stories high, while a tower, six stories high, rises above a central entrance. The building cost $825,000, and in it practically every high-school need has been provided for. Five stories of the tower are occupied by a portion of the library, an art room, a museum, and astronomical instruments. On the tower roof special provision has been made for observation of the heavens.



The Broad Fire Escapes So Designed That They can be Used Daily for Entering and Leaving the Building

The auditorium, which is easily accessible from the main entrance, accommodates 2,000 and has a stage seating 300. The main floor of this big assembly room can be divided by rolling partitions into three sections, those on either side being designed for the study of music



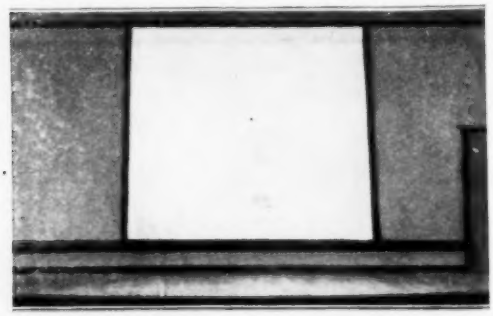
Partial View of the Auditorium Which Seats 2,000: Rolling Partitions can be Drawn Down between the Pillars, Dividing the Area into Smaller Rooms

and dramatic expression. Springs make these partitions easy to operate. It is anticipated that motion pictures will play an increasingly important part in future educational work, and a

A Portion of the Tower Roof So Arranged That It can be Utilized for Observation Purposes by Astronomy Classes

special room for projecting machines has been provided, also a stage, the back wall of which serves as a screen.

The social side of school life has not been forgotten, one room 80 ft. long being available for student functions. By means of rolling partitions it can be divided into smaller rooms for class work. Under the big assembly room is an armory with lockers for 300 high-school cadets. On this level also is a room for the students' bicycles, approached by steps. Adjacent to the steps is an incline on which the bicycles can be pushed. Any pupil who is late or has been absent is required, on arriving at school, to go to the "attendance room" to obtain a card admitting him or her to classes. Adjoining the main building it is planned to erect an agricultural building. Other features



One of the Schoolroom Walls with a White Panel That Serves as a Motion-Picture Curtain

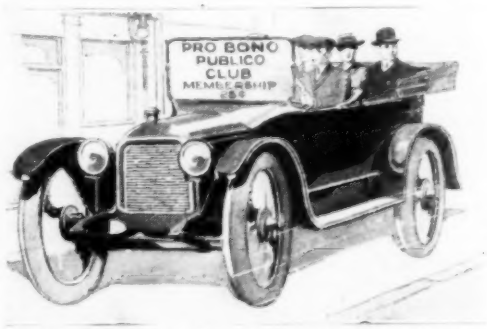
are an athletic field, swimming pool, aviary, and conservatory.

TO BUILD A CATTLE TRAIL THROUGH GUIANA JUNGLE

An undertaking that promises to work a great benefit to the cattle industry in British Guiana and near-by Brazilian ranches is the construction of a 120-mile cattle trail that will bring extensive grazing areas into much closer touch with certain river routes, and hence with coast cities. A loan of $60,000 has been authorized for the improvement. The trail will form a path, 30 ft. wide, cutting through the jungle and connecting a savanna on the Rupununi River with one on the Berbice River. Located at various points along the route will be 10 clearings of 10 acres each, eight rest houses, two corrals, and water craft for making river crossings.

MEMBERS OF "JITNEY" CLUB GET FREE SHOE SHINES

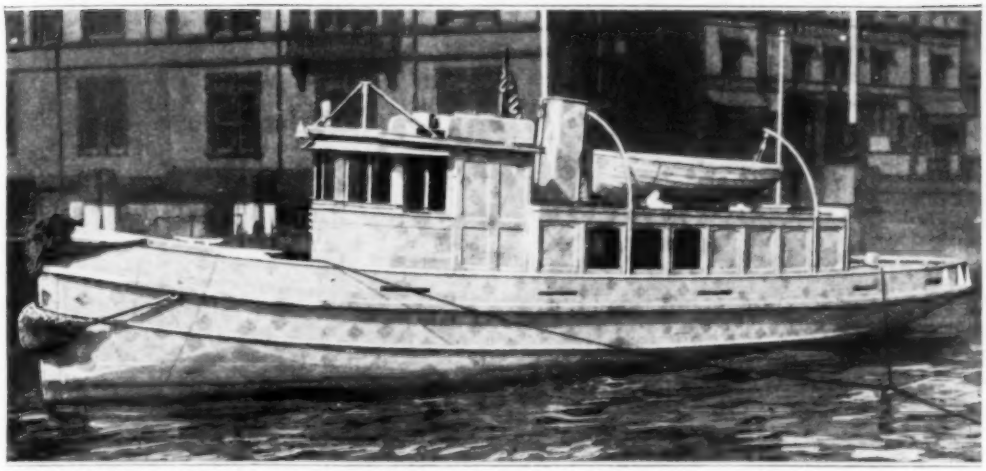
While the number of "jitney" busses in Portland, Ore., has been materially



A Jitney-Club Car: For 25 Cents Each Club Member Receives a Card Entitling Him to Five Rides, a Free Shoe Shine, and Other Privileges

reduced by the passage of a law requiring each "jitney" owner to file a bond of $25,000, several have avoided complying with the ruling by forming a club having a membership fee of 25 cents. Each member is given a card entitling him to five rides, a free shoe shine, and use of club rooms.

According to a recent cable message the east-west transcontinental railway in Australia has been practically completed.



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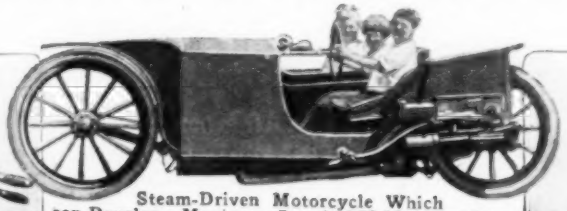
POLICE PATROL BOAT USES CAMOUFLAGE

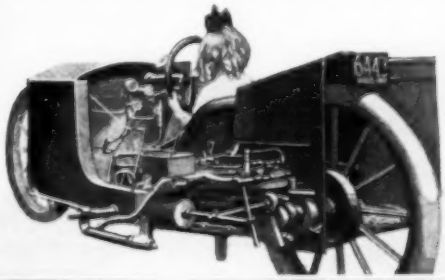
CAMOUFLAGE has been resorted to in painting a New York police boat that keeps a constant watch for enemy activities in the vicinity of the Battery. The whole craft has been painted green and blue in a checkered pattern, and it is said that the disguise is very effective in concealing it at a distance.

ODD-LOOKING MOTORCYCLE DRIVEN BY STEAM

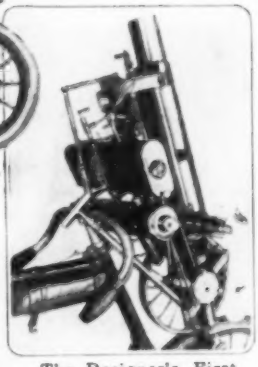
An Improvement on the Early Model Provided with Chain Instead of Friction Drive



Steam-Driven Motorcycle Which can Develop a Maximum Speed of 70 Miles per Hour



View Showing the One-Cylinder Engine Which is Connected with the Rear Axle



The Designer's First Attempt at a Steam Engine for a Bicycle, Showing the Friction Drive

A power vehicle of novel design is a steam-driven motorcycle, capable of a speed of 70 miles an hour, which was built by an eastern manufacturer for his own use. The car has an extra-long wheelbase and a frame of a special spring-suspension type which brings the upholstered chair seat quite close to the ground. It is steered by a wheel, weighs 600 lb., and is so constructed that a sidecar can be attached to it. The boiler is concealed under what corresponds to a hood, the sides of which serve as water tanks with a combined capacity of 23 gal. Gasoline to the amount of 5 gal. can be carried in a tank located under the driver's seat. The engine has a single 4 by 5-in. cylinder and works with 500 lb. of steam. It is connected directly with a crank on the rear axle, no gears being used. The boiler will hold steam enough to permit an average speed of 30 miles an hour, but this can be in-

creased to as high as 30 miles per hour for short distances.

That this interesting machine is the product of much thought and experimenting is shown by the fact that the designer was a pioneer in the field of steam-driven bicycles, having built an engine 23 years ago which was mounted above the handlebars and which drove his bicycle by a friction wheel.

PET GOAT EATS DYNAMITE BUT DOES NOT EXPLODE

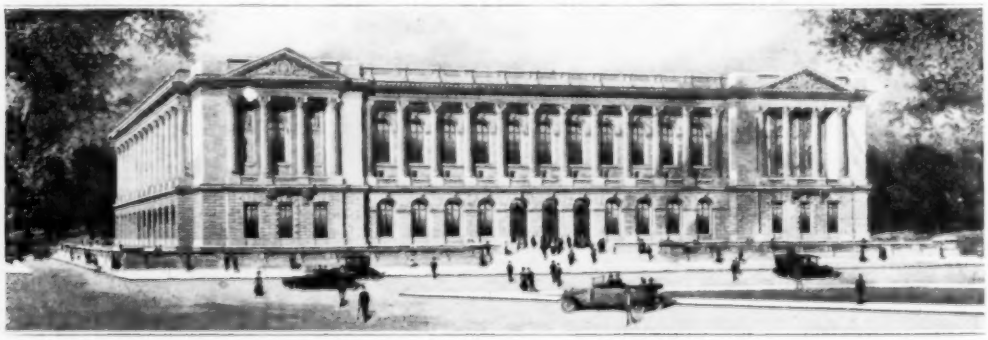
Not long ago the household of a western contractor was thrown into a panic when it was found that the family pet, a goat with a genuinely goat-like appetite, had eaten two sticks of dynamite. The frightened owner, laboring under the impression that "internal combustion" might take place momentarily, gingerly loaded the animal into an auto padded with cushions and, driving to a lonely spot, left him tied to a tree. Needless to say, no disaster occurred.

Awaiting a Fate That Never Came: A Goat Isolated for Fear That Dynamite He had Eaten might Explode

PHILADELPHIA TO BUILD COSTLY LIBRARY

The public-library building which the city of Philadelphia is preparing to erect fronting on one of its famous parkways is to cost approximately $4,000,000 and will embody the latest ideas in library designing. The building will be 340 ft. long and 200 ft. deep, and the sides facing the streets will be adorned with handsome porticoes supported by Corinthian columns. Of special interest are the book stacks, with a capacity of 1,250,000 volumes, which will occupy an area 224 ft. long and 50 ft. wide, the stacks being arranged in seven tiers, four of which will be below the ground level. Numerous labor-saving devices are to be employed to transfer books from one part of the building to another.

The main reading room will be an imposing hall, 224 ft. long, 52 ft. wide, and 50 ft. high, lighted with 13 immense windows and numerous skylights, so that no artificial illumination will be needed by day. Special provisions will include equipment for reprinting, cleaning, and rebinding volumes, a room for the blind, an open-air reading room, and a glass-inclosed reading room on the roof.



Front View of the Public Library Which Philadelphia is Preparing to Construct at a Cost of $4,000,000: In the Building will be Embodied the Latest Features of Library Planning

If One Courts New Diversions, the "Submersible" Offers a World of Sport. Here It is Rising to the Surface After a Brief Duck beneath the Water

SPORTING SUBMARINE BUILT FOR BATHERS' DIVERSION

For those who enjoy aquatic sports in season, a bathers' "submarine" has been invented. The body has fairly typical lines and is composed in part of two tapering pontoons that form the forward and after sections of the hull. Between them is a seat, steering wheel, and bicycle gear, the latter driving a shaft that turns a propeller mounted in the customary manner at the stern. On either side of the craft, near the bow, is an adjustable fin. These members are regulated by the steering column and cause the boat to submerge or travel partly under water at the will of the pilot, who, of course, supplies the motive power by pedaling with his feet. Planes rearward are stationary and used to give stability. When submerged and not propelled, inherent buoyancy will cause the "submarine" to rise to the surface.

CATCH MONKEYS WHEN THEY TRY ON GUMMED BOOTS

The well-known habit of monkeys to imitate the actions of man is cleverly utilized by wild-animal catchers in taking the agile, climbing creatures captive. The hunters' method is to walk about for some time within sight of the wild monkeys, wearing short boots. Then the boots are taken off and gum is placed in their bottoms, after which the men withdraw from the scene. Before long the curiosity of the imitative watchers in the trees gets the better of their caution and they descend and start to try on the boots, whereupon they discover that the footwear cannot be removed and, being unable to climb, are easily captured.

Capturing Monkeys Whose Imitative Instinct has Led Them to Try On Boots in Which Gum has been Concealed so That They cannot Remove the Footwear

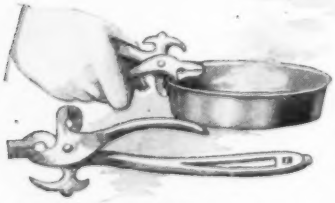
SOME NOVEL AND LITTLE-KNOWN ACCESSORIES

For the Nursery: A White-Enameled Romping Coop That may be Folded Compactly When Not in Use. It is Built on a Platform to Protect a Child from Floor Drafts

Artistic Table-Lamp Screen That Shields One from the Direct Glare of Light That Passes beneath the Shade. Price $4.50

Self-Compressing Wringer Suited for Mops of All Sizes: It is Used with an Ordinary Bucket, is Easily Operated, and Protects the Hands. Price $2.50

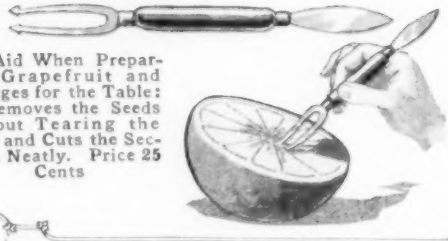
Adjustable Desk Lamp Equipped with Shield That Offers Protection to Eyes While the Rays are Focused on the Work in Hand. Price $1



Combination Tool That Serves a Score of Functions around a Residence: It Is a Stove-Lid Lifter, Wire Stretcher, Nail Puller, Pan Holder, or Whatever One Wishes to Make of It. Price 50 Cents

This War-Time Market Basket Isn't a Basket at All. The Bag Holds a Big Load and the Light Truck Permits It to be Carried without Exertion

A Chair, Cradle, Jumper, and Swing Combined in One Piece of Nursery Furniture: The Chair may be Adjusted from a Reclining to an Upright Position



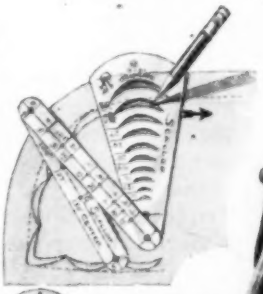
An Aid When Preparing Grapefruit and Oranges for the Table: It Removes the Seeds without Tearing the Pulp and Cuts the Sections Neatly. Price 25 Cents

INTENDED FOR THE HOME AND ITS MEMBERS

Dried Blossoms are Used for Decorative Purposes, a Twisted Stem Provides a Handle, and Half of a Shell Forms the Bowl of This Odd Cocoanut Basket Intended for Flowers

Of Convenient Size for a Soldier's or Sailor's Pocket: A Fountain Pen Shaped Like a Rifle Cartridge. When the Screw Cap Is in Place, as Shown Below, the Pen may be Carried in Any Position without Danger of Leakage. Price $1.50.

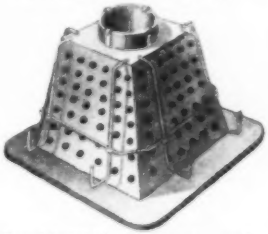
Provided in Different Colors and Sizes to Match and Fit Women's Shoes: A Rubber Heel That may be Worn or Removed as the Occasion Dictates. Price 50 Cents



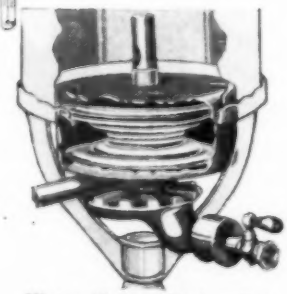
For Outlining Scallops on Linens and Lingerie This Marker has been Devised. It Enables One to Do the Work Properly and without Difficulty. Price 50 Cents

Attractive Basket for War-Time Knitters: It is Held at a Convenient Height by a Folding Stand. A Raffia Tray Holds the Needles When They Are Not in Use. Price $7.50

Double-Boiler Cooker That Steams Food and Brings Out Its Flavor: The Steam Rises through Perforations, Condenses, and Returns to the Water Pan. Price, One Size, $1.50



Combination Toaster and Egg Cooker Designed to Permit Two Operations to be Performed Simultaneously over One Gas Burner. Price 25 Cents



Water Heater Designed to be Mounted Immediately beneath Tank: It Conserves Space in Close Quarters, Heats Water Quickly, and is Supposed to be Economical in Its Consumption of Fuel

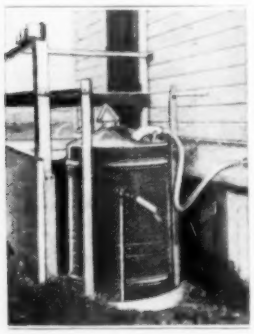
When Properly Installed on a Phonograph, the Flash Lamp Illuminates a Record and Enables an Operator to See Distinctly Where He is Placing the Needle. A Slight Movement of the Supporting Arm Lights or Extinguishes the Bulb. Price $3

NEW CORNER FENCE POST OF CONCRETE

A corner fence post of concrete, which will remain upright without the aid of guy wires, is cast with triangular extensions projecting from two sides, at right angles to each other. The bases of these extensions are sunk into the ground so that the post is firmly anchored and well braced. A surface in which staples may be driven is provided by imbedding two-by-fours in the concrete and fastening them with bolts which are also cast in the concrete. When the wood decays it can be removed and new material substituted.

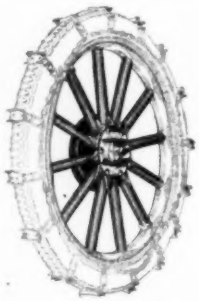
WATER-DRIVEN VACUUM CLEANER

Low cost of operation and simplicity of construction are the especially commendable features of a serviceable vacuum - cleaning system, the working parts of which can be installed in the basement, or out of doors in milder climates. Suction is produced by the movement of a tank which rises and falls in a water lock, its upward movement being caused by a plunger which operates in a vertical pipe in the center of the cylinder. As this pipe fills with water the tank rises in the lock, causing the air to be sucked in through a hose connected with the cleaning nozzle. When the tank reaches a certain height a trip automatically actuates a valve which shuts off the water and opens other valves that allow the tank to fall. About five seconds is consumed before the cylinder again starts to travel upward, and during that brief period there is a cessation of suction.



TWO-PIECE AUTO CHAIN EASILY ATTACHED

A new automobile-tire chain is particularly convenient for motorists because it is made in two sections. If a car is deep in the mud one section of the chain can be attached at a time, thus making unnecessary the use of a jack to raise the wheels out of the mire. Both parts attach to certain spokes by means of loops — an arrangement that prevents the wheel from spinning inside the chain. The plates on the cross links are channel shaped, with projecting edges that sink into the earth and prevent skidding or slipping. These members are curved to fit the tread of the tire and so occasion a minimum of wear.

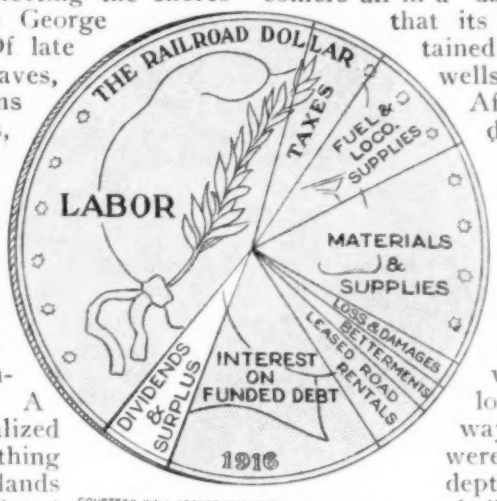


BRUSH OF FOUNTAIN TYPE FOR TYPEWRITERS

A convenient article with which various parts of a typewriter, particularly the type keys, can be cleaned quickly and without soiling the hands consists of a stubby brush, having a cylindrical handle of metal, designed to be filled with cleaning fluid. By pressing a valve in the side of the handle the desired amount of liquid can be discharged into the bristles, making them more effective in removing dirt. One filling of the brush will last several months.

ISLANDS OF LAKE GEORGE SAVED FROM WAVES

During the past summer the state of New York expended several thousand dollars in protecting the shores of islands in Lake George against erosion. Of late years heavy waves, rolled up by storms and passing vessels, have worked serious damage. Many of the picturesque wooded islands frequented by summer campers have been irreparably injured and some of them completely destroyed. A sportsman, who realized that unless something were done the islands would be lost, stimulated campers to riprap some of the shores. Subsequently he laid the matter before the legislature. An appropriation was voted and the work carried on by the state. The movement began when its sponsor commenced fortifying the shores of his favorite island by covering them with rocks, all of which had to be "imported." He furthered the work by requiring each visitor to bring ashore at least one stone when landing. It became the practice of visitors to load their boats with material when starting for the isle.

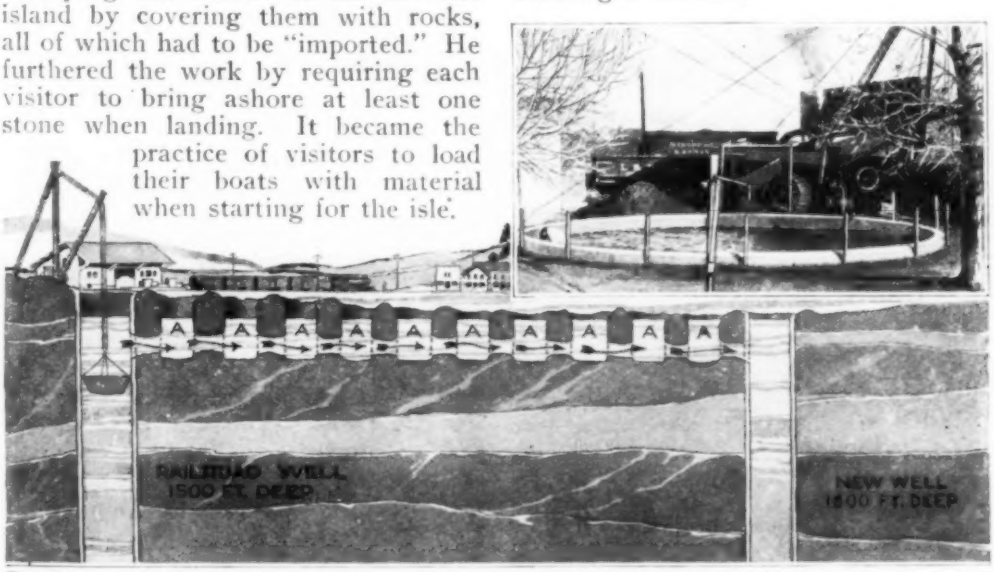


COURTESY WALL STREET MAGAZINE

THE RAILROAD DOLLAR
What the Average Railroad Does with Each Dollar It Receives from Freight and Passengers is Graphically Shown in the Diagram

BLAST SUBSURFACE PASSAGE FOR ARTESIAN WELL

When a mining boom flooded Miami, Okla., with hundreds of newcomers all in a "day," the town found that its water supply, obtained from shallow wells, was inadequate. After drilling to a depth of 1,600 ft. and failing to strike a flow, an interesting scheme was employed. At regular intervals between the dry bore and a deep well situated in the local yards of a railway, ten 50-ft. holes were drilled. At that depth a stratum of chalky rock was encountered. A steel bucket was then lowered into the railroad's well to prevent loosened material from falling into and clogging it, and an outlet for the water provided by blasting at the bottom of each of the ten bores and forming a channel.



The Diagram Shows How the Underground Passage was Provided by Connecting the Bores Marked "A," so That the Water could Flow from the Railroad's Well to That Sunk by the Municipality

CHAIN-OPERATED JACK FOR AUTOS

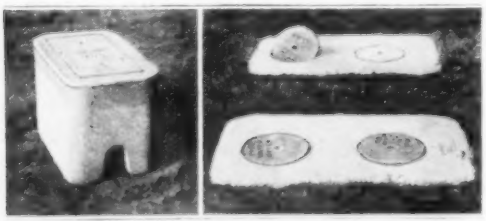
A new automobile accessory is a chain-operated jackscrew which enables a motorist to raise or lower his car while standing erect. The screw of the new implement is actuated by gearing instead of by a lever. When the jack has been properly set under

An Auto Jack of a New Type: The User Simply Pulls on the Chain Which Actuates Gearing, Causing the Screw to be Raised or Lowered, as Desired

an axle, a few pulls on an endless chain which engages the gearing will cause the load to be lifted to the desired height. Lowering is quickly effected by reversing the movement of the gearing.

METER BOXES OF CONCRETE INSTEAD OF METAL

Meter boxes may now be added to the ever-increasing list of articles being made of concrete. Their shape is determined somewhat by the character of the meter installed in them. The

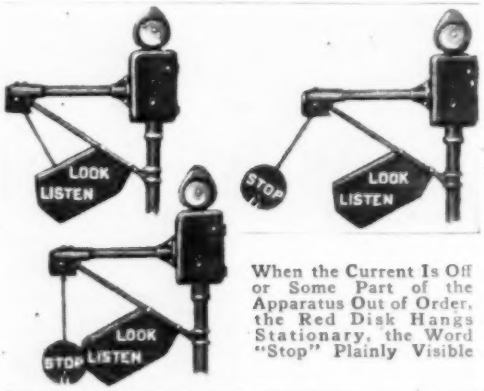


A Meter Box of Concrete, Placed above Ground to Show Its Shape; Also a View Illustrating the Manner of Imbedding the Boxes in the Parkway

form employed by one concern is rectangular, with rounded corners and one or two lids on the top which give access to the instrument within. These boxes are imbedded in the parkway next to the street, in cities where the climate is mild the year around. In colder regions they are installed in the basement. They are superior to metal protection because they will not corrode and are not easily broken.

CROSSING SIGNAL WARNS WHEN OUT OF ORDER

As a safeguard against accidents at railway crossings where flagmen are not regularly stationed, an electric warning signal of the bell and wigwag type has been developed to provide double protection. Suspended from a cross arm is a swinging rod carrying a disk on which the word "stop" is plainly legible. When the track is clear this device is concealed in a shield on which the familiar words "look, listen" appear. When a train approaches, the red disk swings back and



When the Current Is Off or Some Part of the Apparatus Out of Order, the Red Disk Hangs Stationary, the Word "Stop" Plainly Visible

forth and the bell rings. The important feature, however, is that the electric flagman gives warning when it is out of order. Failure of some part of the apparatus to function properly, or lack of current, causes the "stop" disk to swing out of its casing and hang stationary in a plainly visible position, thus preventing the assumption that the track is clear because the bell and wigwag are not operating.

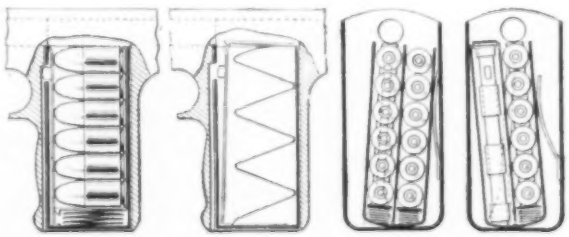
MARINE GARDENS NOW LIGHTED FROM BOATS

A Sketch Showing the Manner in Which the Glass-Bottom Boats at Santa Catalina Island have been Equipped with Searchlights: A Marvelous Effect is Produced by Using Various Color Screens and by the Presence of Swarms of Fish Attracted by the Light

The remarkable beauty of the marine gardens at Santa Catalina Island, Calif., which tens of thousands of tourists have viewed from glass-bottom boats, has been greatly enhanced for spectators by equipping the underside of the vessels with searchlights, enabling sight-seers to enjoy the aquatic spectacle at night as well as in the daytime. When the powerful lamps are turned on, not only is the strange vegetation shown in striking relief, but the water instantly swarms with an infinite variety of fish, attracted beneath the boats by the glare. So great are the swarms of moving creatures that at times they completely obscure the bottom of the sea from view. To add still more to the almost magical aspect of the scene, various color screens are placed in front of the searchlights, causing the illuminated water to take on rare and changing hues. Current for the searchlights is generated on the boats, the crafts' engines supplying the necessary power.

DUAL CARTRIDGE CHAMBER FOR AUTOMATIC FIREARMS

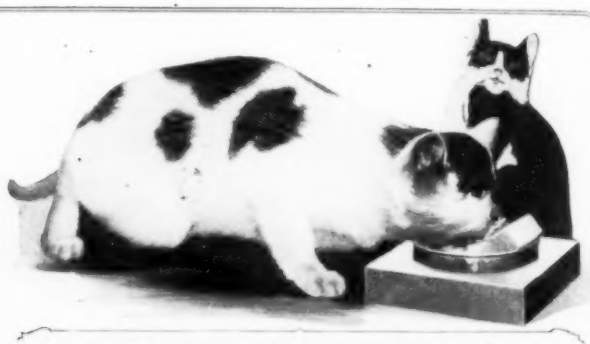
To increase the magazine capacity of automatic pistols, a double cartridge chamber has been devised. It is pivoted at the base, and its position regulated by springs. When filled and put in place, it is locked against oscillation, while cartridges in the first of its two stacks are held in alinement for movement to the firing position. When all of these have been discharged, a spring bar releases the locking button and causes another spring to tilt the chamber so that the second stack of cartridges is instantly brought into alinement. The magazine arrangement does not in any way affect the operation of the weapon.



First Drawing: Locking Button in Place Holding Magazine against Compressed Spring as Shown in Third Picture. Second Drawing: Button Released with Result Apparent in Fourth Sketch

PLAYTHINGS AND FURNITURE IN NEW DESIGNS

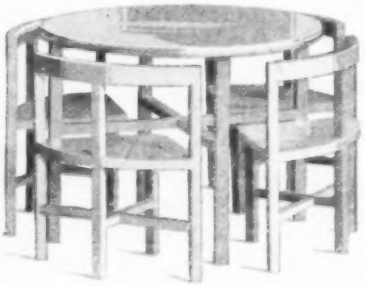
The Toy Man, Shown Above, is Very Much Given to Losing His Head—That Is, His Head can be Changed as Often as One Likes, Making Him a Policeman, a Rough Rider, or a Sea Captain. But in Any Case He Rocks if You Give Him a Push



Almost Everyone Knows What a Fondness Puss Has for Catnip. Well, Here Is a Catnip Dish Made Especially for Her and One can See for Himself How Handy It Is, Because It Has a Wooden Stand to Keep It from Tipping Over. A Painted Cat is Mounted at One Side

An Immortal of Nursery Lore—None Other Than Humpty Dumpty—Sits Here on the Top of a Clothes-Hanger Standard, Instead of on a Wall, so That Little Boys and Girls can Hang Their Clothes on His Outstretched Arms and Legs. Mr. Dumpty is Painted in Bright Colors

Above, at the Left, and Below Are Views of Newly Designed Furniture for the Play Room. The Little Dining Table, 24 Inches Across, is Provided with Cute Chairs Having Bottoms Shaped Like Pieces of Pie so That They Fit Snugly under the Table. The Kitchen Cabinet Is Just Like Mother's and so Is the Tea Wagon Which Topsy, the Maid, is Using in Waiting on the Diners

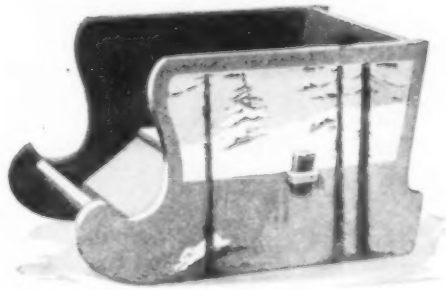


THAT WILL DELIGHT THE HEARTS OF CHILDREN

Here Is an Auto That would Delight Any Kiddie's Heart. It is Driven with Pedals and Has a Seat and Step at the Back, for Little Brother or Sister. Either Side, at the Rear, Are Nickelplated Handles. The Windshield, Steering Wheel, Bumper Fenders, and Running Board Are Just Like Those on Big Motor Cars

The Little Fellow on the Right has Kept His Equipment for Mimic Warfare Quite Up-to-Date, This Armed Push Car Which was Made by His Daddy, Being His Special Pride. Of the Three Pieces of Artillery Mounted on It, the Largest One is Most Admired by His Playmates for by Turning a Crank the Young Gunner can Make a Continuous Roar and Rattle That Sounds for All the World Like Machine-Gun Fire

On the Left Is a Strongly Built Wooden Push Car for Tots from Two to Five Years Old, All Painted in Red, White, and Blue and Made to Steer Like an Auto. At the Back Is a Handy Little Box with a Hinged Lid Where Treasure, Dispatches, or Ammunition may be Carried, According to the Need of the Mimic World



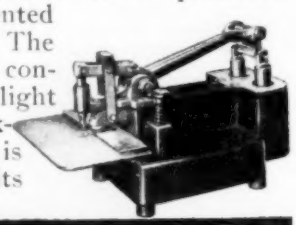
A Strong "Comfy" Sled with a Handy Foot Rest and Artistically Painted with Pines, Snow Scenes, and Scampering Rabbits: It Is 24 Inches Long and 16 Inches Wide and the Sides Are so High That Baby will Not Tumble Out

MONEY BELT FOR BOYS IN UNIFORM

A money and keepsake belt is now being made for men in the army and navy service, which is worn about the waist beneath the shirt or jacket and is provided with three pockets fitted with snap buttons. The largest of the pockets is for photographs and keepsakes, and is preferably worn directly in front, while the smaller ones, located on either side of it, are designed to receive money of all denominations. The belt is made of double-texture waterproof cloth, handsomely bound.

PATENT CHECK AND DEVICE FOR PROTECTING SAME

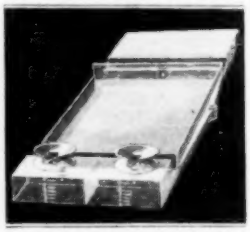
Assurance against loss by alteration of checks is obtained by using a new electrically operated check protector and a patented form of check. The protector is connected with a light socket by a flexible cord and is provided at its front end with a punch that is actuated electrically by pressing a button. Each perforation is made conspicuous by a large inked dot. Printed across the face of the checks used with this machine is a series of squares arranged in groups of 10, those in each group being numbered from 0 to 9, inclusive, and the various groups being designated "cents," "dimes," "dollars," "tens of dollars," "hundreds of dollars," and so on, according to the style used. After filling in the writing on a check—including the amount, in figures—perforations are made with the punch in the squares corresponding to the amount stated.



A New Check Protector and a Portion of a Patented Check Used with It: The Dotted Perforations Show the Amount to be Paid

SEVERAL DISHES COMBINED IN DEVELOPING TRAY

A photographer's tray of new design is provided with three covered chambers, or wells, into which the user can pour his solutions and then mix them by allowing them to flow into a common reservoir which is the tray proper, thus doing away with various individual containers. Two of the wells are located at one end of the tray and one at the other. Stoppers are provided for their mouths which are funnellike—a shape which makes the chambers easy to fill. No extra dish for measuring is necessary because the sides of the chambers are graduated.



TOOL FOR TRUING THREADS ON TIRE VALVES

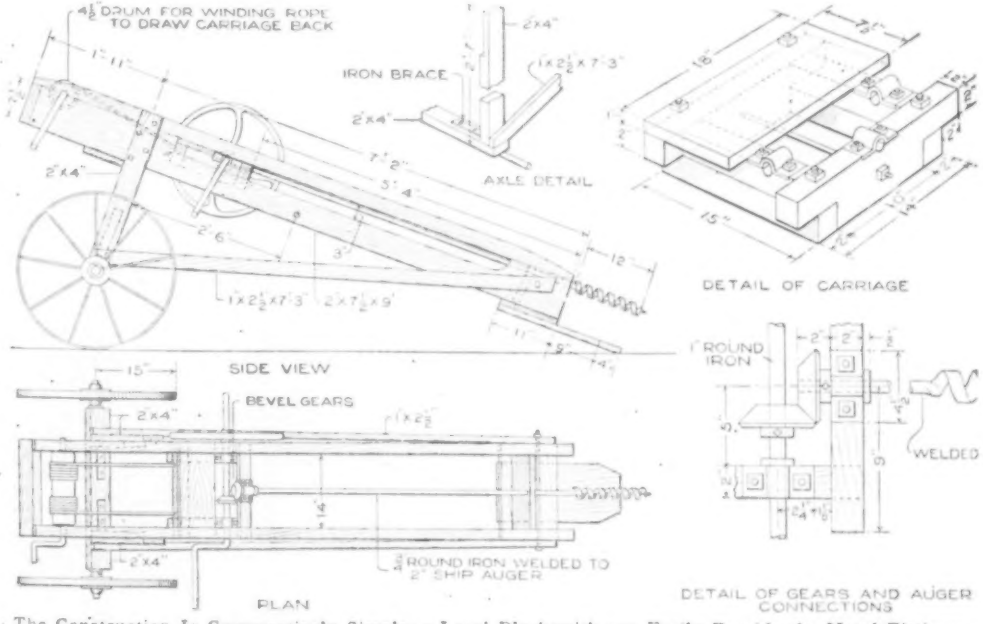
A new tool is being manufactured with which tire-valve threads can be easily trued, thereby preventing slow leaks and hence insufficient inflation, which is harmful to a tire. The die, which constitutes the outer portion of this tool, screws down onto the stem, recutting its external threads, while a tap, inside the die, recuts the internal threads. This tool can often more than pay for itself in preventing needless tire wear.

Homemade Stump-Boring Machine an Aid to Settlers

By E. R. McINTYRE

AN inexpensive, homemade stump-boring machine is being used extensively by settlers in getting the tough, deep-rooted, long-leaf pine stumps of Mississippi in shape for blasting, in the process of land clearing. Those who have fair mechanical experience build the machine themselves, buying only the necessary metal parts, and local blacksmiths build the outfits at a cost of not over $30. The inventor gave the machine to the settlers for use in de-

This Stump-Boring Machine of the "Day" Type Is Very Efficient for Preparing Stumps for Blasting in Clearing Land



The Construction Is Comparatively Simple: a Local Blacksmith can Easily Provide the Metal Fittings, and the Wooden Parts can be Made in the Farm Workshop

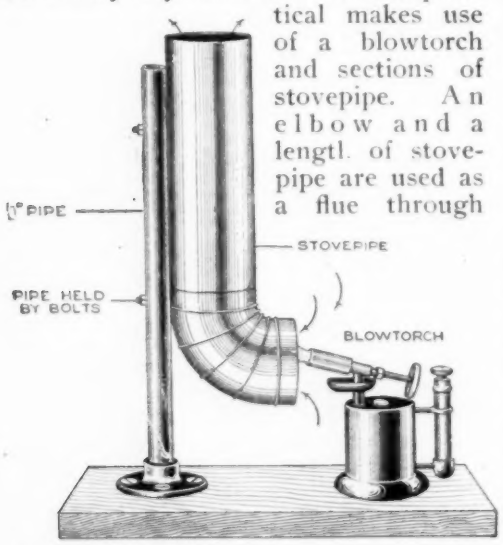
velopment work. This method of boring stumps for blasting is practical for use in many other sections of the country. In a recent test at the Mississippi Agricultural Experiment Station, one man in five hours bored through 27 stumps, averaging 18 in. at the top and 22 in. diagonally, as bored, in diameter.

The construction of the machine, as detailed in the working drawings, is comparatively simple. The large wheels make it easy to transport the outfit, which is set up, when in use, as shown in the photograph. The holes are bored by a 2-in. ship auger, which is welded to a ¾-in. round-iron rod. The power is transmitted to this rod from a crankshaft, geared to the auger rod. The crankshaft and the beveled gear at the upper end of the auger rod are mounted in a carriage, shown in detail. This carriage slides in ways cut into the sidepieces of the frame. The carriage is drawn up, in removing the auger from a bored hole, by means of the drum and ropes at the upper end of the frame. The connections of the auger rod and its driving arrangement are shown in detail. The crankshaft is made of 1-in. round iron bent at one end to form a handle. A flywheel is set on the other end.

The upper end of the main frame is about 5 ft. from the ground. The elevation of the frame, in this manner, braces it against the stump in boring, and brings the crankshaft to a height at which it can be easily turned. It also causes a slight pressure against the auger, which aids in boring steadily at a diagonal, yet does not hinder withdrawal of the auger.

Heating a Small Workshop by Means of Blowtorch

A method of warming the small shop on wintry days that is novel and practical makes use of a blowtorch and sections of stovepipe. An elbow and a length of stovepipe are used as a flue through



This Arrangement was Successfully Used to Warm a Small Shop When the Thermometer Outside Stood below Zero

which the hot air from the flame of the blowtorch passes. As the heated air rises in the pipe, cold air is drawn in at the opening around the flame, as indicated. The supporting standard is fastened to a base of suitable size, and the pipe is fastened with bolts. The torch should be placed so that the end of the flame just enters the end of the pipe.—Kenneth M. Bard, Manawa, Wisconsin.

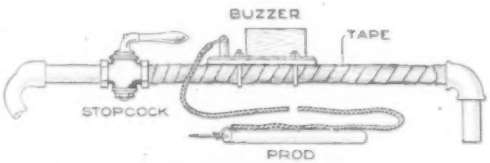
Methodical Oiling of Automobile Proves Economical

Proper lubrication is one of the most important factors in the preservation of the life of an automobile. The best way to oil the machine is to do it methodically. A procedure that is thoroughly satisfactory, and which does not require a chart of the type in quite common use, is to "map out the oiling campaign" on the car itself. Give every oil hole and every place to be oiled a number, running serially from 1 up. Starting with oil hole No. 1, stamp it with a small die-stamping outfit. At hole No. 10, stamp that number, and stamp each tenth hole thereafter. Then, in oiling, proceed from the first hole, keeping a mental count. If the count agrees with the stamped figures, probably no points have been overlooked.—G. N. Near, New York, N. Y.

Device Aids in Filling Storage Batteries

Storage batteries of the sealed type are difficult to fill, and when a number of cells require filling at one time, it is tedious to watch the height of the solution. The device shown in the sketch audibly indicates when the battery is properly filled. It consists of a length of iron or brass pipe, provided with a stopcock as shown. A short length of lead pipe is fitted into the elbow. The lead pipe should be of such a length that when the longer pipe is laid flat on the top of the cell, the lead pipe is within ¾ in. of the plates. A small buzzer is mounted on the pipe, one terminal being connected thereto. To the other terminal of the buzzer connect a length of stranded lamp cord, attaching the latter to a steel point fitted into a short stick.

The filling tube is connected to the

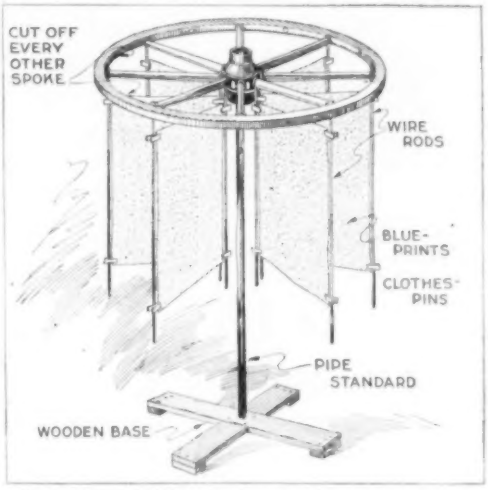


The Buzzer Indicates When the Battery has been Filled to the Proper Height

water supply by means of a rubber hose. In use, the short pipe is inserted into the vent in the cells; the steel point is then forced into the terminal on the battery, spanning at least one cell. When the electrolyte has reached the proper height, the circuit is closed, and the buzzer announces the fact.—Thomas W. Benson, Philadelphia, Pa.

Wheel Arrangement for Drying Blueprints

A handy arrangement for drying blueprints, and insuring that they will be reasonably flat, can be made by mounting an old buggy, or light wagon, wheel on a pipe standard, as shown in the illustration. Every other spoke is cut out. Two stiff wires are suspended from each spoke, the blueprints being stretched between the wires and held by spring clips, or clothespins. The wooden base is set in a suitable trough,



The Blueprints are Stretched between the Wires Suspended from the Spokes of the Pivoted Buggy Wheel

into which the water from the prints drips. If they are given a slight preliminary drying, the arrangement may be used on a wooden floor.—Joseph Thalheimer, Jr., Phoenix, Ariz.

A Post Extractor Mounted on Wheels

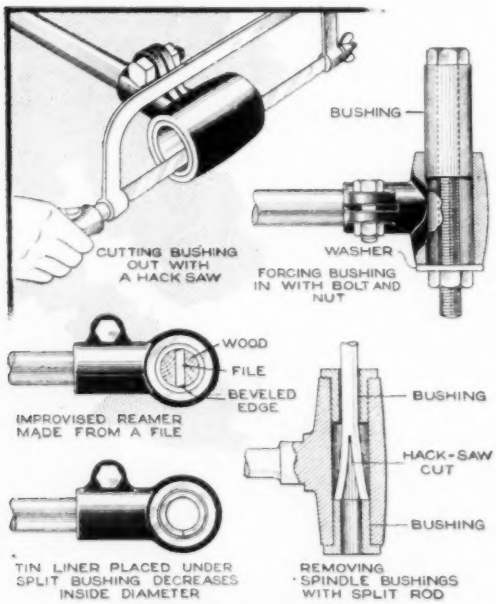
A type of post extractor, which has long been in use by circus men and tent gangs, can easily be adapted for use by farmers, or others who find it necessary to repair or remove fence posts. An old pair of wheels and an axle from a worn-out farm machine, or

The Post is Quickly Withdrawn with Slight Effort, by Bearing Down on the End of the Lever

wagon, provide a suitable truck. A heavy piece of hard wood is bolted to the axle, as shown, and an old wagon pole, or even a timber cut from a small tree, can be used for the lever. The wheels may also be made solid, of wood spiked together in cross layers. The operation of the outfit is simple: A chain is formed into a sling around the base of the post and hooked over the short end of the lever. By bearing down on the other end of the lever, the post is withdrawn. Usually, several holds must be taken with the chain to pull out the post completely.—C. L. Moore, Cleveland, Ohio.

Removing and Replacing Automobile Bushings

Worn bushings in an automobile cause lost motion in the connected parts, as well as undue vibration and noise. The bushings in the steering connections and spring shackles are readily replaced, with the least dismantling of the parts, by the use of a hacksaw and a bolt, with a nut to fit. The blade of the saw is disconnected at one end and placed inside the bushing, as shown. The saw slot cut permits the bushing to be easily removed. To force the new bushing into place, it is filed slightly at one end to start it into the hole. Place the bolt through, and slip a washer over, to make the nut turn easily. A wrench at each end will force the bushing into place. After the bushing is in place, the pivot pin or bolt will probably be too large to enter. For increasing the inside diameter of the bushing, a discarded file makes an excellent reamer, when ground as shown.



The Old Bushings are Removed by Suitable Methods, and New Ones Inserted, as Indicated

Sometimes new bushings are not at hand, in which instance a liner of tin, if fitted around the outside of the split bushing, will reduce the inside diameter sufficiently to be of further service, as shown. Another bushing remover, which is useful for removing the end bushings in the wheel spindles, is made by using a metal rod as shown. Splitting one end of this with a hacksaw and bending the ends apart, makes it ready for use. The ends are sprung together and placed through the upper bushing, after which they will spring open. A hammer is used to drive out the bushings. Coating the exterior surface with grease or graphite grease helps to reduce the labor of replacing the bushings.—G. A. Luers, Washington, D. C.

Cutting Drafting Sheets Quickly from Roll of Paper

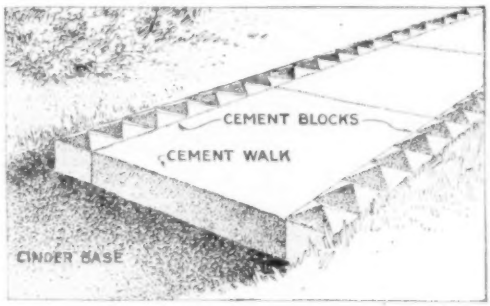
In cutting sheets from a roll of paper considerable stock is often wasted by carelessness in tearing or cutting the paper. A good plan is to unroll the roll to the size of sheet desired, and then to use the edge of the roll as a pencil guide in marking a cutting line. When a number of sheets of the same size are to be cut, and they do not extend the full width of the roll, a section of paper may be cut off and rolled up; the width of the sheets is then marked along the length of the roll, and the roll cut through at one stroke. The resulting strips are then cut to length. —F. B. Mallory, Flemington, N. J.

Sandpaper Finger Tips an Aid in Feeding Press

In feeding a printing press rapidly, the bare fingers smear the ink when the sheet is pulled off. Instead of winding a strip of sandpaper around the finger, cut round disks of coarse sandpaper a little smaller than a dime, and glue disks on the tips of the first and second fingers. This method enables the feeder to get the printed sheet every time, and does not smear the work.—H. S. Hart, Shreveport, La.

Concrete Borders on Walks Protect Grassplots

Careless pedestrians often ruin lawns along the edges of walks, even though the walks are of sufficient width. A good method of overcoming this temptation to make a path on the grass bordering the walks is to set a row of low

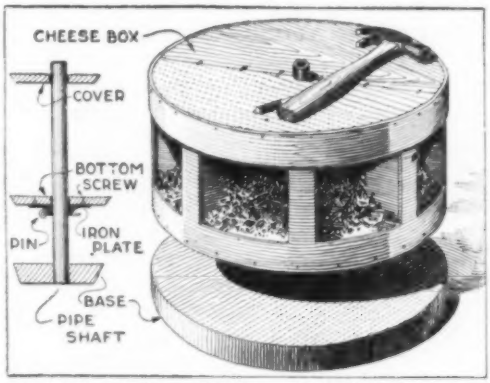


The Pyramid Borders Keep Pedestrians on the Walk and Protect the Adjoining Grassplots

concrete pyramids along the edge of the walk, as shown. They may be cast in blocks, or built in a continuous strip with the walk.

Revolving Nail Holder Made from Cheese Box

A shop contrivance that saves much time and is a help in keeping the shop in order was made from an old cheese box, and provides for nails and other small hardware. Compartments were fitted in the box radially, like the sections of a pie, and openings cut into the sides of the box, as shown. The box was then mounted on an iron pipe, set in a wooden base. An iron flange

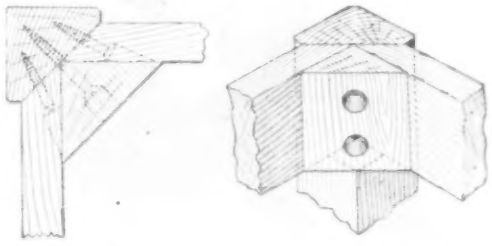


The Various Kinds of Nails and Small Hardware are Placed in the Compartments, and Conveniently Removed by Revolving the Cheese Box

plate was fastened to the bottom of the box, and provides a good bearing for a large cotter pin set through the pipe as a support for the box.—F. E. Brimmer, Dalton, N. Y.

A Strong Table Frame Quickly Made

A common practice in making cheap tables is to end-butt the sides into the legs, connecting the sides by a bridge piece and fastening the latter with screws. The screws need frequent tightening, because of shrinkage and vibration. The method shown is stronger and quicker: Saw out the triangular portion at the top of the leg, and surface the cut with a sharp chisel and block plane. Miter the ends of the two sides against the surface, as shown, and fasten the joints with glue and screws. Reverse the portion cut out

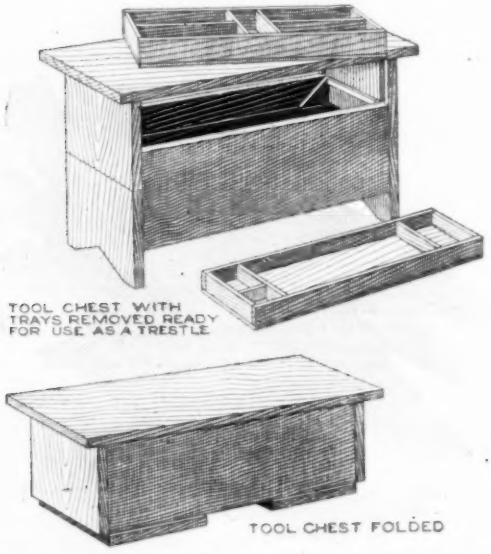


This Table-Frame Joint is Quickly Made and Very Strong

from the leg, and fasten it into the corner.—Henry Simon, Laguna Beach, California.

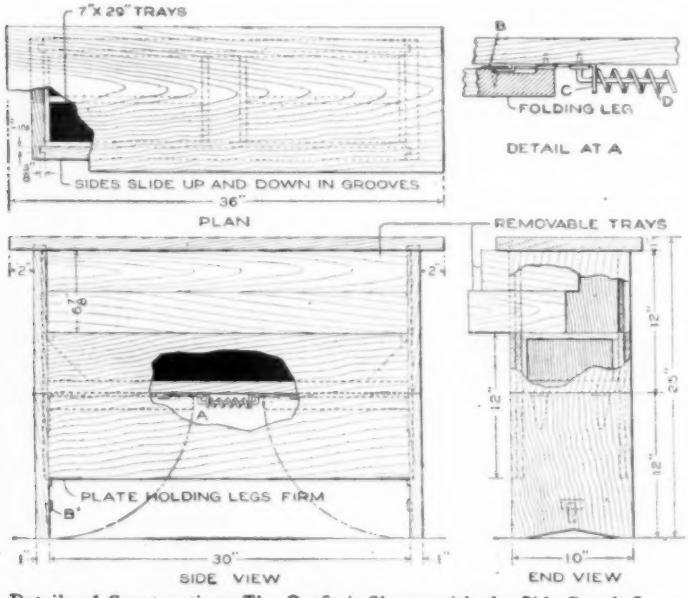
Combination Tool Chest and Trestle Folds Compactly

The mechanic who has small repair jobs to do in various places, making it necessary to carry tools and sawhorses, as well as the home mechanic who has use for a compact jobbing outfit, will appreciate this combination tool chest and trestle. When folded, as shown, the chest is compact, and affords a good handhold at each end of the top for convenience in carrying. On the job, the lower ends of the legs are folded from under the tool chest, the sides of the latter sliding down to the position shown in the upper sketch. The trays fit inside of the raised sides and can be removed easily. The top of the trestle gives ample space for work, and as a rest for sawing.



The Combined Tool Chest and Trestle Folds Compactly for Convenience in Carrying, and, When Opened, Provides a Substantial Support

The construction is detailed in the working drawings. The end supports are hinged across the middle, their inner edges are grooved, and the two sides of the tool compartment slide in the grooves, as detailed in the plan. The lower tray rests on strips at each end, and the upper one slides on the lower. When the outfit is closed, the lower ends of the support are folded under the tool compartment, the sides being raised in their grooves to their position under the top. The folding ends are locked, at A, by a spring device, shown in detail. A small metal plate, B, is fitted over a part of a shallow mortise in the inner side of the leg, at B, in the side view. Two angles of metal, C, are mounted on a rod, and held apart by a coiled spring, D. When the legs are folded into place, the angles C are pressed together between the thumb and first finger, and their sliding ends permitted to catch under the small plates B. The spring D holds the angles in this locked position. The other details of construction

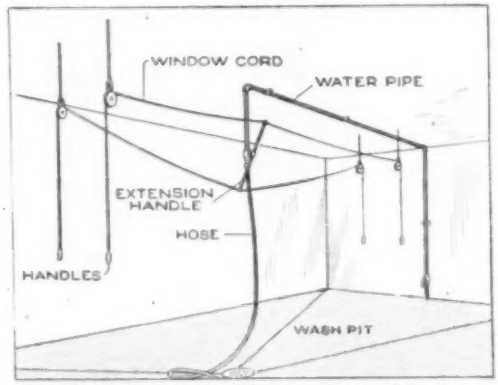


Details of Construction: The Outfit is Shown with the Side Panels Lowered in Their Grooves, and the Trays Partly Removed. The Lower Ends of the Supports Fold under the Bottom, as Indicated in the Side View, and are Locked by the Mechanism Shown in the Detail at A

are simple, and are shown in the dimensioned working drawings and sketches.—George H. Jackson, Toronto, Ont., Canada.

Overhead Controls for Garage Auto-Washing Hose

In a large auto garage where water was used through a meter, it was found that ordinary shut-off nozzles on the ends of the hose used for washing automobiles were not desirable because of the danger of scratching the finish. A large waste of water resulted by the use of a hose without a means of shutting off the water close at hand. As a result the overhead-control system shown in the sketch was installed, and worked satisfactorily. By this means the operator can shut off the flow of water from his position at any one of the four corners of the machine, by pulling on the proper control handle.

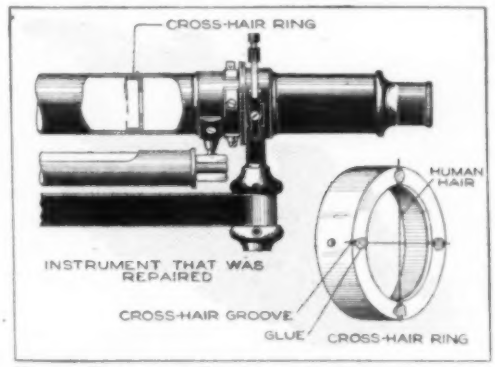


The Water Supply for Washing Automobiles in a Garage was Controlled Conveniently by This Overhead Arrangement

A valve was set at the end of the water pipe near the ceiling, and its stem was fitted with a lever, as shown, to which the four control cords were attached and run through pulleys.—Robert L. Cook, Madisonville, Ky.

Repair for Broken Cross Hairs in Surveyor's Level

A sudden jar or fall of a surveyor's instrument sometimes causes the hairs to break from the cross-hair ring in the level, and usually the instrument is sent back to the factory for repairs. When an emergency repair was necessary, a method was devised which proved of permanent value. The instrument was disassembled and the cross-hair ring removed. The grooves

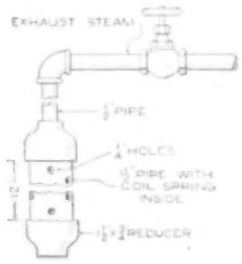


Human Hairs were Glued into the Cross-Hair Ring of the Surveyor's Level and Provided a Satisfactory Substitute for the Broken Cross Hairs

for the hairs were cleaned, and two human hairs were glued into place, as shown. The glue was applied hot, and the hairs were drawn taut across the notches. In a similar repair, carbon filaments from an electric-light bulb were used and proved serviceable, but were harder to put into place because of their brittleness.—A. P. Midland, New York, N. Y.

Muffler for Injecting Steam into Water Tank

The sketch shows a muffler, which I am using in a feed-water tank, or hot well, as the marine engineer calls it, for stopping the noise created when steam is used for heating water. It consists of a 1½-in. pipe, 1 ft. long, perforated by ¼-in. holes, all around. I filled the pipe with light coil springs from pumps, and reduced the bottom end to ¾ in. and the top to ½ in. and fitted the pipe on, as indicated, with a control valve.—Richard Alte, Baltimore, Md.

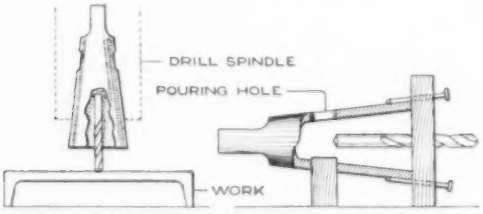


Holder for Marking Punches Strapped to Workman's Belt

Especially in the machine industries, it is a common practice to mark various parts before assembling them, and the workman who does this must go from place to place with his set of steel marking punches. It is unhandy to carry these in the box usually provided, and a wide-awake mechanic rigged out a harness-and-belt arrangement, as shown, which proved to be very convenient. He made a curved piece of wood to fit the body at the waistline and attached the straps to it. The punches are carried in holes in the wooden piece, and are handy to get at. —C. C. Spreen, Flint, Mich.

Babbitting Drill in Drill-Press Spindle Avoids Heavy Work

Some castings were to be drilled, and the only means at hand were a hand breast drill and a heavy radial drilling machine. The chuck of the machine was 4 in. too low, in its upper position, to permit the castings to fit under it. The job was accomplished by babbitting a drill in one of the sockets used to reduce the size of the spindle hole for small taper-shank drills. To hold the drill in place while pouring the babbitt around it, the rigging shown in the sketch was used. The drill was set into the center of a wooden block, held in place as indicated. The socket was suitably plugged, and the metal poured in. The chuck was taken out of the spindle, and the socket became practically a chuck, saving enough height on the spindle to make room for the job.



A Tedious Hand-Drilling Job was Avoided and the Work Turned Out in Short Order on a Drill Press by the Method Shown

Tin and Celluloid Cover Protects Shop Tally Cards

Inspectors in manufacturing plants, and checkers who use tally cards to check up the work turned out, find difficulty in keeping their records clean and neat. A large automobile plant has provided, for inspectors, holders made of tin as shown. Three of the edges are turned over to form a groove for the card, and transparent celluloid covers the card and also slides in the grooves. The tin provides a base for the card, and it is necessary to withdraw the celluloid only sufficiently to expose the card as desired.—J. S. Hagans, Toledo, Ohio.

Liquid Shoe Polish Used as Auto Radiator Paint

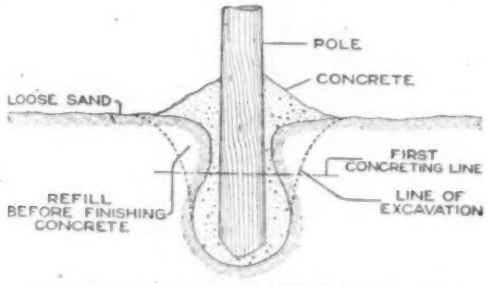
Because of the difficulty of getting into the spaces in an automobile radiator to clean or paint them, this part of a car is often neglected. The appearance can be improved by painting the webbing with black, liquid shoe polish, diluted to the proper consistency. A convenient method of applying the paint is to use the dauber which usually is attached to the cork of the bottle. —G. A. L., Washington, D. C.

Paraffin Repairs Small Holes in Cold-Water Tank

When a copper-lined, or porcelain, tank for cold water leaks from small holes, dry off the surface thoroughly with a rag. Then locate the leak, and pour hot paraffin on it. In an emergency, drops of wax from a candle will also do the work. This will often give years of life to such a tank.—Joseph J. Jiannotto, Brooklyn, N. Y.

Substantial and Economical Concrete Base for Poles

In setting telephone poles, and poles for similar service, in loose sand or gravel, the method shown was used with excellent results. The cup-shaped hollow below the heavy line was first concreted around the pole and then the refill, noted above, was put in

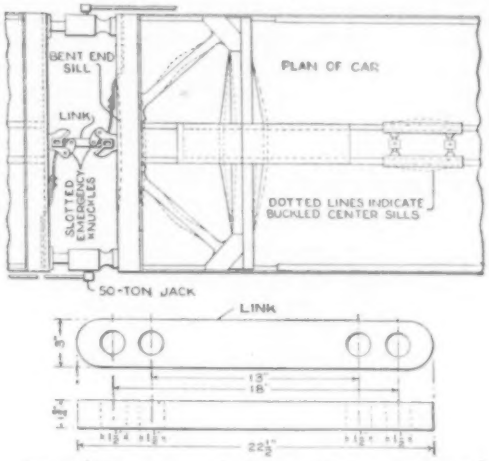


This Type of Base for Poles Is Strong, and Economical of Concrete

place and the concreting finished. The refill is advantageous both because of the narrow girth it gives to the concrete around the bottom of the pole, thus being harder to pull out of the ground, and also because of the saving in cement.—Roy H. Poston, Flat River, Missouri.

Method of Straightening Freight-Car Frames

The drawing shows my design used on many cars for straightening center sills, end sills, body bolsters, and braces by pulling out the stoved-in ends of cars with powerful jacks. A link, shown in detail, is fitted to the couplers, and the jacks are placed against the end sills, pressure being applied by means of levers. The dotted lines

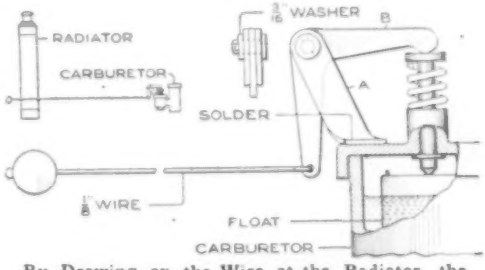


The Car Frames are Straightened by the Use of Powerful Jacks

indicate the buckled portions to be straightened.—John W. Shank, Renovo, Pa.

A Tickler for Priming Carburetor

A kink that the autoist will appreciate is for priming the carburetor without the necessity of lifting the hood. Two small strips of steel, A, are soldered to the top of the float cover. With the aid of a steel pin, a hinge is formed for the crank B. This is also made from strip steel. A steel wire runs from the crank, through and to the outside of the radiator. A pull

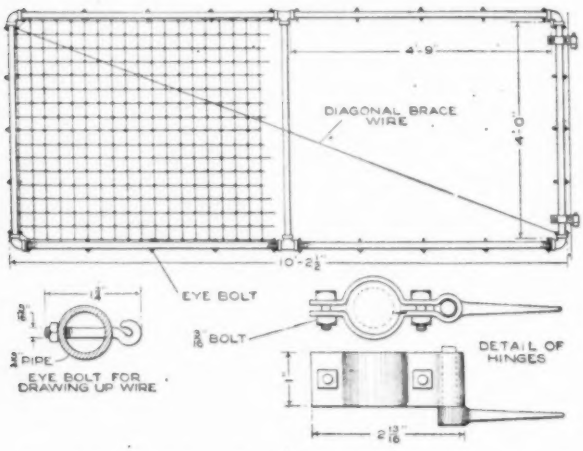


By Drawing on the Wire at the Radiator, the Carburetor is Primed without Raising the Engine Hood

on the wire pushes down the plunger of the tickler, causing the float to drop, and in this manner the carburetor is primed.

A Strong Gate Built of Iron Pipe

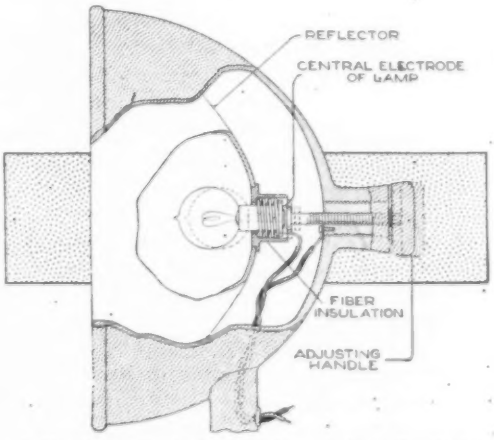
A neat and substantial iron gate can be made in the home or farm workshop with iron pipe and fittings. A practical design is shown in the illustration. The gate is made as follows: Prepare four pieces of ¾-in. galvanized-iron pipe, 5 ft. long and threaded at both ends. Cut three pieces 4 ft. long. Four elbows and two tees are also needed. Fit the gate up, as shown, leaving out the two bottom pieces at first. These two pieces are made as shown, one end of each being threaded twice as far as the other end. Screw the long threaded end into the elbow as far as possible, then fit the other end to the tee and screw it into place. The long thread at the ell will become partly unscrewed as the short end enters the tee. Fit both pieces in this manner. The gate frame is now complete, and should be covered with woven-wire fencing. The detail shows the small eyebolts that support the wire and serve to draw it tightly in place. A diagonal wire brace is then put into place, and drawn tightly by twisting it or inserting a turnbuckle. The hinges are made from a piece of ⅛ by 1-in. strap iron, bent to fit around the pipe of the gate and clamped with bolts, as detailed.—B. Francis Dashiell, Dunkirk, Md.



This Substantial Iron Gate can be Made in Various Sizes from Pipes and Fittings

Electric Auto Spotlight Arranged for Easy Focusing

To secure a focusing arrangement that may be readily adjusted to suit various road conditions, I refitted the electric spotlight on my automobile as shown in the diagram. By turning the adjusting handle, the globe is forced in or out, as indicated by the dotted lines, causing the light to spread or be confined in a long, narrow beam, as desired. I sawed off the old handle of the lamp and fitted a bronze bushing into the end of the reflector extension. Into a disk, which forms the adjusting handle, I fitted a bronze screw, the head of which was ground to the shape of a nail head, as shown. This screw is set firmly in the handle, and is adjusted in the threaded bronze bushing. The end of the screw makes contact with the central electrode of the lamp. The lamp is carried in an insulation bushing and is fitted with a coiled spring, which forces it back into contact with the adjusting screw. The

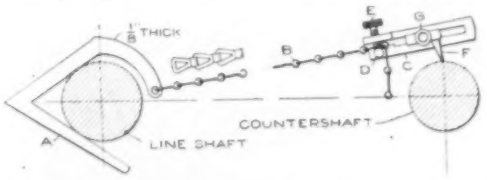


A Simple Method of Adjusting an Auto Spotlight was Provided by Fitting the Reflector with These Special Parts

wiring is connected up as shown, one of the wires being set in the bronze bushing by means of a screw, and the other fixed to the shell of the light-globe plug.—John E. Hogg, Alhambra, California.

An Alining Tool for Shafting and Machinery

A handy tool, worthy of a place in any mechanic's tool chest, is an alining device, for determining parallelism of machinery shafts and fittings. The hook A is of 1-in. sheet steel, shaped as shown, and snaps over the first shaft. A flat-link brass chain, B, fastened at one end, is drawn through the head C to the approximate distance, and clamped to the stud D by means of the thumbscrew E. Final adjustment is obtained by moving the pointer F along the slot in which it is set, and clamping the thumbscrew G. In opera-

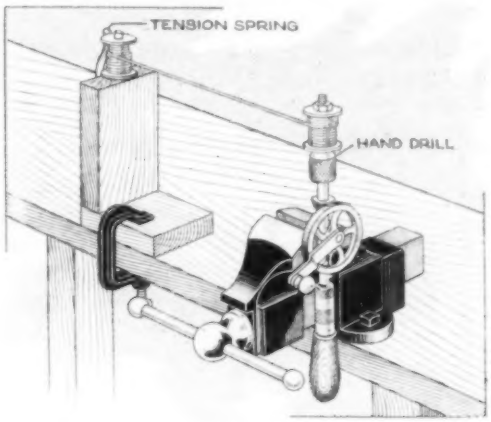


Shafting and Other Parallel Machine Parts are Lined Up Accurately with This Handy Tool

tion, the approximate adjustment is made at one end of two shafts to be lined up, and then the final adjustment is made. The distance is then scaled at several points on the shafting to insure accuracy.—J. B. Murphy, Plainfield, N. J.

Winding Small Magnet Coils with a Hand Drill

In the winding of a considerable number of small magnet coils, no lathe being available, the rigging shown was adopted. It operated very satisfactorily, and was reserved for future use. A small hand drill, clamped in a vise, was used in turning the spool upon which the coil was to be wound. The spool, as it was wound, was held on a bolt from which the head had been cut, and the bolt was clamped in the chuck of the hand drill. The spool of new wire was mounted on a bolt set in a suitable support, clamped to the bench top. To prevent the

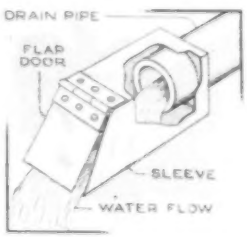


An Ordinary Hand Drill Mounted in a Vise Provides a Practical and Rapid Means of Winding Small Coils

spool from unwinding too rapidly and to provide a tension on the wire, a brass spring was arranged to bear against one of the flanges of the spool. In operation, the crank of the hand drill is turned with the right hand, while the wire is guided onto the spool. After a couple of spools have been wound, the winder can be operated very rapidly and produces a neat coil.—C. A. Foster, Cincinnati, Ohio.

Preventing Rodents from Entering Drain or Sewer Outlets

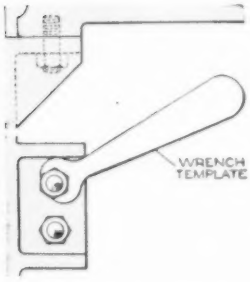
A simple and effective device for preventing rodents from entering an outside drainpipe opening is made as follows: Construct a sleeve to fit over the open end of the drainpipe. The end of the sleeve is cut off at an angle, as shown. Hinge a heavy sheet-iron flap over the end of the sleeve. The weight of the flap keeps it closed and prevents the ro-



dents from entering. The force of the outflowing water opens the door and holds it open until the waste has passed. The current prevents the rodents from passing up when the door is opened. The device should be painted thoroughly, and the hinge kept oiled.—B. F. D., Baltimore, Md.

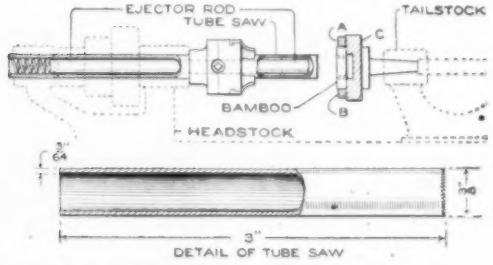
Wrench Template Saves Draftsman's Time

When designing machinery fastenings for close quarters, a convenient method of determining whether there is sufficient room for turning a wrench is to use a template cut from cardboard, as shown in the sketch. A set of these templates for common nut sizes can be kept on hand, in full or half size. A hasty layout of the doubtful corner is made, and the template gives the information required.—J. A. Ryan, Chicago, Ill.



Hollow Drill for Boring Bamboo and Sheet Fiber

Holes cannot be bored in bamboo easily with ordinary drills, because of the ready splitting of this material. Having occasion to make several hundred ⅜-in. holes in narrow strips of bamboo, I made the tube saw shown. A ⅜-in. steel tubing, 3 in. long, with walls 3/64 in. thick, was used. Saw teeth were filed in the trued edge of the tube, so as to lead the points toward the direction of rotation. The tube was held in the chuck of a lathe. A rod extended through the spindle of the lathe and inside of the tube, and was held in position by a spring. The rod automatically pushed out the centers as bored. A wooden pad, C, mounted on a taper stem at the tailstock, centered the strips of bamboo between blocks A and B. The tube saw is also handy for use on thin ivory, bone, fiber, hard rubber, and similar materials.—L. M. Drake, Daytona, Fla.



The Tube Saw Cuts Round Holes in Thin Material without Splitting It Easily

A Wire-Skinning Tool of Handy Size

To make a tool for removing the insulation from electric wires, and which is small enough to be carried in a tool kit, it is only necessary to have a short piece of ¾-in. iron bar, a portion of a hacksaw blade, and a setscrew. A slit is first cut in one end of the bar, and a shallow notch filed as shown. The saw blade is sharpened on the back edge, and inserted in the slit so that the cutting edge is out. A setscrew holds the blade in place. To skin the insulation from a wire, pass the latter through the notch. The knife edge will slit the insulation neatly, so that it can be easily pulled aside.

Substitute for Pipe Vise

Not having a pipe vise at hand when it was necessary to thread a small piece of pipe, I improvised one from a pipe plier and an ordinary vise. The pipe was held in the plier and the plier handles clamped in the vise firmly. This method worked very well, especially with small pipe.—Abel Greenstein, New York, N. Y.

Building Up Low-Voltage Generators

Overcomes Inexpensively the Failure to Retain a Proper Residual Magnetism

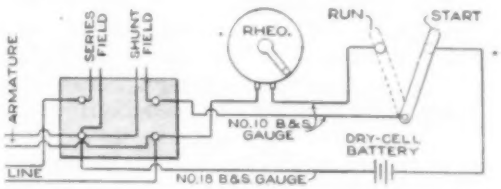
By L. N. ROBINSON

THE low-voltage, compound-wound, direct-current generators, employed on electromagnetically operated pipe organs, refused to build up to normal voltage with a permanent setting of the shunt-field rheostat. The solution of the trouble is outlined in this article for application to similar difficulties. The trouble was observed particularly after the machines had been in service a few years. When a machine had been standing idle for a few days, it was quite often, though not invariably, impossible to obtain normal voltage without varying the setting of the field rheostat, or making other adjustments of the machine. The operators employed a rather questionable method in building the voltage up under such circumstances; namely, short-circuiting the line terminals and thus magnetizing the machine by the current in the series field.

A machine was run intermittently for observation. It was rated 300 watts, at 10 volts, 600 revolutions per minute. The organ, to which the generator was normally applied, would operate satisfactorily within a voltage range of 8 to 12 volts. The generator was located in the basement, and the organ on an upper floor of the building. The organist could not be expected to go downstairs and tinker with the generator if it did not build up before he was ready to play. For the same reason, it was essential that the shunt-field rheostat be set to give the desired voltage, and that no adjustment of the rheostat be required in starting.

Ordinarily, sufficient residual magnetism was retained so that the generator produced .3 volt without excitation. The machine would build up satisfactorily with the ordinary setting of the field rheostat when the shunt-field circuit was closed with this .3-volt residual armature voltage. At normal voltage, the shunt field required approximately five amperes' exciting current.

Sometimes, after the generator had been standing idle a few days, there was sufficient residual magnetism to induce only .1 volt in the armature. When the shunt-field circuit was closed



The Diagram Shows the Wiring and Connections for the Building-Up Arrangement

with this .1 volt impressed through the ordinary setting of the field rheostat, there was not sufficient field current to start the machine building up. This loss of residual magnetism was undoubtedly due to the iron being too soft, or of inferior quality. Obviously, it would be quite expensive to take the machine apart and to replace, or harden, the iron. Also, it would incur a considerable loss to ship the machine to the factory and to trade it in for a new and supposedly better one.

The question then was to make it operate as it should at small additional expense and with as few added complications as possible, because of the inexperience of the person who was regularly called upon to operate it. It was seen from the saturation curve that separate excitation of two amperes' field current would produce a generator terminal voltage of aproximately five volts, which was too small to operate the organ, but sufficient to magnetize the iron. Then, if the connections were immediately changed to give shunt excitation, magnetism sufficient to start the building up of the generator would be retained.

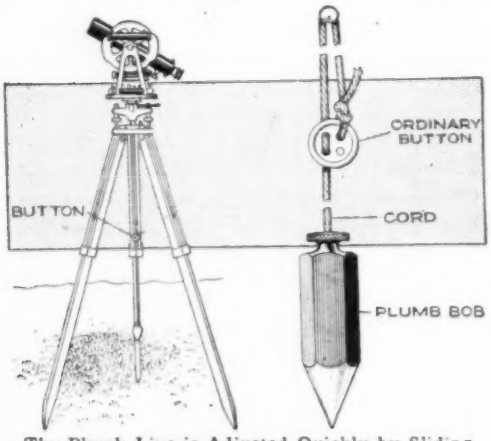
This was accomplished by the use of a dry-cell battery and a little additional wire, by locating a single-pole, double-throw switch, as shown in the diagram, at the keyboard, so that the organist, by operating the switch before begin-

ning to play, could throw the battery in temporarily and then change over to the shunt excitation. The arrangement is very simple and does not require any particular experience to operate. The battery used in this case was located near the generator in the basement. With the use of the sizes of wire shown in the diagram, only one cell was required in the battery. More than one cell would be undesirable in this case, because the battery would give excitation enough to build up sufficient voltage to operate the organ. The organist might discover this and operate the organ with the switch in the starting position. This, of course, would consume the battery very rapidly and give frequent cases when the battery would be in such condition that it would not serve its purpose.

The battery must be renewed occasionally, probably once a year. Thus it is seen that the initial cost of the remedy is small, the maintenance cost merely nominal, and that the system gives the desired results.

Coat Button Takes Up Slack in Plumb Line

A handy little kink that will save much time in adjusting the length of



The Plumb Line is Adjusted Quickly by Sliding the Button along It

line attached to a plumb bob is to provide the line with a button adjuster. An ordinary strong coat button, having four holes, is used. The end of the cord is tied in one of the holes, and the other end is then passed through the supporting eye, or over any other supporting point, and through two of the other holes in the button. The adjustment is made by lifting the plumb bob and sliding the button along the cord.

Garage Patrons Indicate Service Desired by Cards

In a garage where a large number of trucks and pleasure cars were stored, patrons frequently found that their cars were not given certain attention, such as washing, filling of the gasoline tanks, and the making of minor repairs. This work was to be done overnight, and as many of the customers were transients, a loss resulted to the garage owner. He, therefore, made up a set of metal signs, painted in black and white, and indicating the kind of service desired. These signs were kept near the garage door in a rack. The patrons placed the signs on their machines, and the attendants gave the service desired without further orders. The patrons, employes, and the owner were all better satisfied.—L. E. Turner, Brighton, Massachusetts.

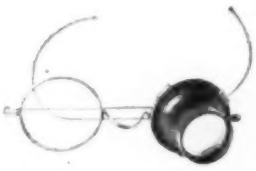
Soldering Joints in Heavy Wire

In soldering large-gauge wire joints, trouble is often experienced in that the solder does not take hold. The flux is usually blamed. By proceeding as follows, good results will usually be obtained: Clean the wire to the required length, and put on the soldering paste. Then dip the ends into the soldering pot slowly, giving them a good tinning. After the wire has cooled off, make the joint in the usual way, and then put a little paste on and solder the joint by holding the ladle as near as possible, pouring the solder over it slowly.—A. Gemmell, Ansonia, Conn.

¶In lacing belts, never cross the laces on the side which is to be placed against the pulley, as they will be cut quickly.

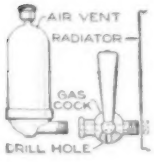
Magnifying Eyeglass Fitted into Spectacles

A watchmaker's magnifying glass can be used to advantage for many purposes other than watchmaking, but most persons cannot hold the glass over the eye with convenience. The photograph shows a holder which is used like a pair of spectacles. To make it, the lenses were removed from a cheap pair of spectacles, by crushing the glass with a hammer. The rims then were made circular, to approximately the same diameter as the rim of the eyeglass. A strip of tin, 5/16 in. wide, was cut into small sections and bent at right angles 1/16 in. from one end of each. These angles were soldered to the rim of the spectacles, as shown. The eyeglass was then fastened on the rim by bending the tin strips over the edge. The tin was painted black to match the eyeglass.—Alpha C. Johnson, Washington, D. C.



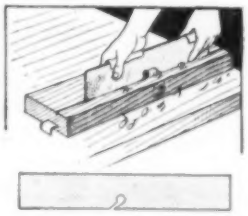
Valve Frees Steam Radiator of Air Quickly

Having steam radiators of the one-pipe system, I found difficulty, after opening up the valve, to rid the radiator of cold air without taking off the cap and screw of the air vent. By the method shown, I not only do away with this trouble, but also save coal, as I can close the stove damper sooner. The device was made as follows: Take a gas cock from an old gas stove; drill a small hole down through the center, as indicated. Remove the radiator air vent and connect the gas cock. When the handle is horizontal, the air vent is working, and when it is up, the air can escape through the drill hole.—James G. Evans, Richmond Hill, N. Y.



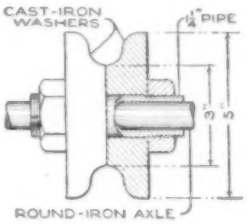
Small Groove Plane Made from Steel Strip

I recently had occasion to plane some grooves, 1/16 in. wide, in a board, and accomplished the work easily by the use of a specially made plane. A piece of cold-rolled steel, 1/16 by 1 by 6 in. long, was rounded at the corners slightly, and then a hole, 5/16 in. in diameter, was drilled 1/4 in. from the edge and near the middle, as shown. A slot was cut to the hole on an angle of 45°. By driving a cold chisel into the slot, the sharp corner was bent out 1/32 in. This edge was sharpened to form a cutting edge. If the tool is to be used for much work, this edge can be case-hardened.—U. G. L., Chicago, Ill.



Sheave Made from Iron Washers in Emergency

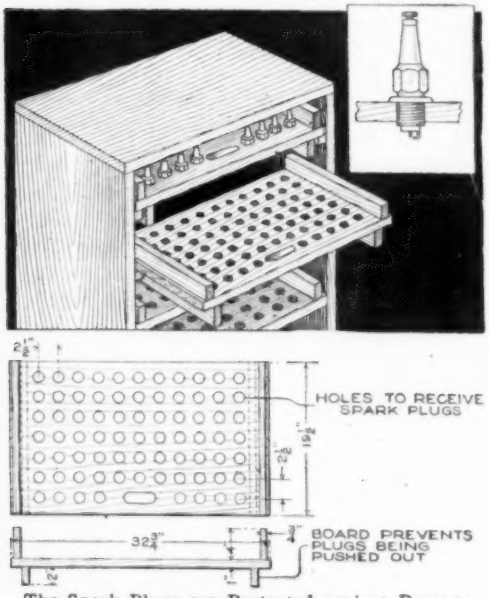
To keep from shutting down on a job where 1-in. rope was to be run over sheaves, it was necessary to make a substitute for these fittings of the usual type, because they could not be obtained within reasonable time. Iron washers, 5 in. in diameter, were used for the purpose, and when fitted together on a bearing, as shown, did the work satisfactorily. The washers were set firmly between nuts on a short section of iron pipe. The bearing axle was fitted inside the pipe and suitably mounted. The sheave gave good service for a long time.—Herman F. Zimmermann, Los Angeles, Calif.



¶Soapy water, applied with a brush over joints in gas or pressure pipes, is convenient in locating leaks.

Stock of Spark Plugs Kept Safely in Racks

Spark plugs are easily injured, especially by the chipping or cracking of the porcelain, when kept loose in a drawer with other material. In the home garage, as well as in the commercial garage or repair shop, racks for the spark plugs will be found useful and economical. Where only a few spark plugs are to be accommodated, a small shelf, or rack, provided with suitable holes to receive the spark plugs, may be used. To care for a larger and more varied stock, a case with special racks, like that shown, is best. The racks are fitted with strips on the upper and lower sides, at the ends, which protect the spark plugs when the racks are set on the bench, or stacked one upon the other.



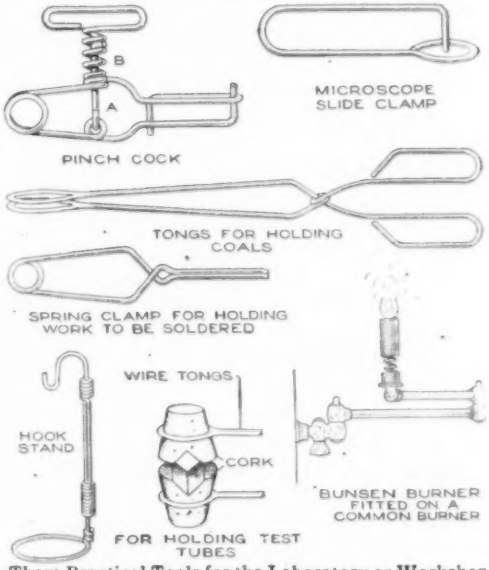
The Spark Plugs are Protected against Damage and Kept in an Orderly Fashion by Providing Racks for Them

Two Handles Used on Small File

In doing some filing with a small rat-tail file, I found it difficult to hold the front end of the file. The job to be filed was in such a position that short strokes were necessary. By fitting another small handle over the front end of the file, I found I could hold it securely and file more accurately. This method is handy in many other forms of filing, even where there is plenty of room.—Lee M. Delzell, Maroa, Ill.

Wire Tools for Laboratory and Workshop Homemade

If a little inventive skill is applied, the worker in the laboratory or small shop can save much time, and expense for the purchase of small equipment, by having on hand a supply of stiff wire and tools for bending it to meet special needs. The several examples of useful tools and implements shown herewith were quickly devised in the laboratory as needed, and will suggest many others. The pinch cock was made of two pieces of wire, A and B, twisted to give a spring pressure on the jaws. The uses of most of the tools are evident. The hook stand can be used in suspending thermometers and other instruments. The tongs with the cork jaws are especially handy for holding hot test tubes. The Bunsen burner, twisted from a piece of wire, is quickly made and practical.—George L. Yaste, Lonaconing, Md.

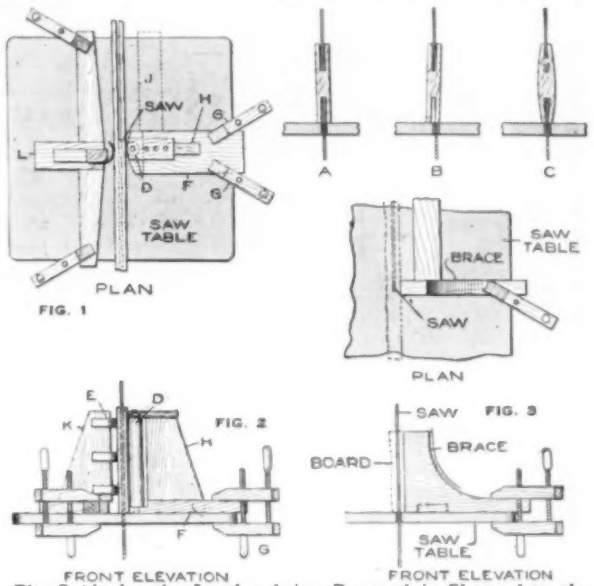


These Practical Tools for the Laboratory or Workshop were Quickly Made as Needed from Stiff Wire

A Resawing Device for the Band Saw

By CHARLES A. KING

IN woodworking shops, equipped with light machinery, there are times when heavier machinery can be used to good advantage; a job of resawing, for instance, makes heavy demands upon a light band saw, but there is so little of such work to be done that it would not be wise to provide expensive equipment for it. The usual method then is to resaw boards up to 8 in. wide on a circular-saw table, by making a cut from each edge of the board, and for boards wider than this the saw cut is made from each edge, and the band saw run through the cuts to finish the job, as at A. This method is often unsatisfactory, as indicated at B and C. These troubles may be overcome by making a simple guide, as shown in Fig. 3, for light work, or as detailed in Figs. 1 and 2, for heavier work.



The Guide for the Lumber being Resawed is Clamped to the Saw Table, as Shown in Figs. 1 and 2, and the Boards are Fed between the Roller D and the Springs E

In this device, the operator can control any ordinary deviation of the saw by swinging the board to the right or left, and can regulate the speed of the feed. The essential elements of the device are the roll D, and the springs E, Figs. 1 and 2. The face of the board being resawed should run against the roll, contact being maintained by pressure from springs E. The roll is supported by a frame. The base F is of hard wood, 1¾ in. thick and 6 in. wide, and long enough to permit the hand screws G to hold it firmly at the edge of the table. The brace H is placed well to the back edge of F, as shown, to permit the front hand screw greater leverage. The roll is of hard wood, 2 in. in diameter. The piece J, indicated by dotted lines, may be fastened to the table by a hand screw, and prevents F from pushing back. The brace H is fastened to the base by screws through the latter.

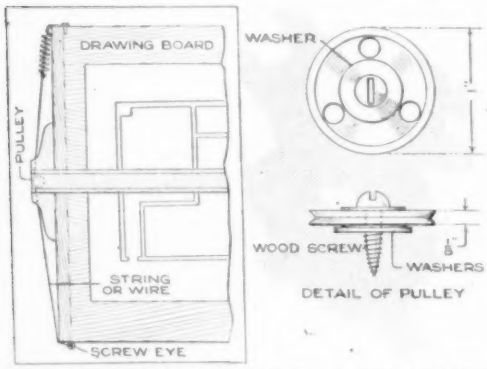
The spring block K is of hard wood. The springs E are made of an old band saw, and are fastened by screws. Piece L is halved and screwed into the bottom piece, which is 1¾ by 4 in. at the middle.

In adjusting the device, care must be used that the bearing of the roll against the side of the board is at the cutting edge of the saw, as seen in Fig. 1. The springs bear ¼ in. or less ahead of the roll. The roll is adjusted to suit the thickness of the stock, by moving the entire frame. Slight changes in the relative positions of the roll, the springs, and the saw may be made by either tilting the table, adjusting the upper or lower guide laterally, shimming with paper or pasteboard, or by adjusting the saw wheels.

Attachment Keeps T-Square Rigid on Board

Many draftsmen prefer the common type of T-square because of its wide range of use and the ease with which it can be removed from the board and used as a straightedge. A simple attachment that does not lessen these ad-

vantages of the T-square, and adds even more convenience to its use, is shown in the sketch. A small pulley, as detailed, is fastened to the lower



The Spring-and-Cord Arrangement Holds the Head of the T-Square against the Guiding Edge of the Drawing Board

side of the head. A strong cord is fixed to the end of the board, as indicated, and held taut against the pulley by a coiled spring. Thus the head of the square is held firmly against the guiding edge.—J. E. Cahill, Jr., New York City.

Bins Built in Sections Provide for Increase in Capacity

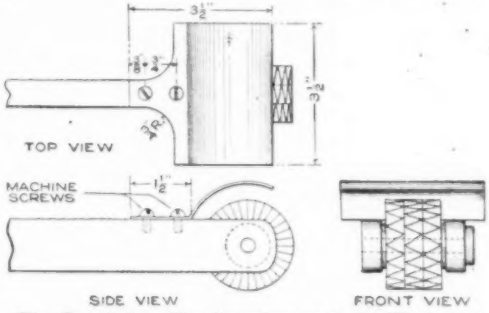
A bin that may be increased or decreased in capacity has advantages over the fixed-volume type generally found in shops and factories. It is

Bins That can be Built Up in Sections Are Especially Useful for Shop Trucks

especially advantageous for hand-truck factory transportation, since the trucker may add or remove sections as the load to be carried demands. The first-section, or foundation, bin has a bottom; the others are without bottom. A ledge, formed by nailing on a border of strips so that their edges project above the top of the bin, is put on each section, as shown. The lower part of the added section may be fitted into the top of the section below, thus building up the bin to the height desired.

Guard for Emery-Wheel Dresser

In truing up emery wheels, as is frequently necessary in large shops, considerable danger may be occasioned during this operation if the emery-wheel dresser is not properly guarded. The small sparks and chips may injure the workman's eyes. A good safety



The Guard does Not Interfere with the Work and Protects the Workman

measure is to fit the dresser with a guard made of sheet metal and fastened as shown in the illustration.—K. L. J., Pittsburgh, Pa.

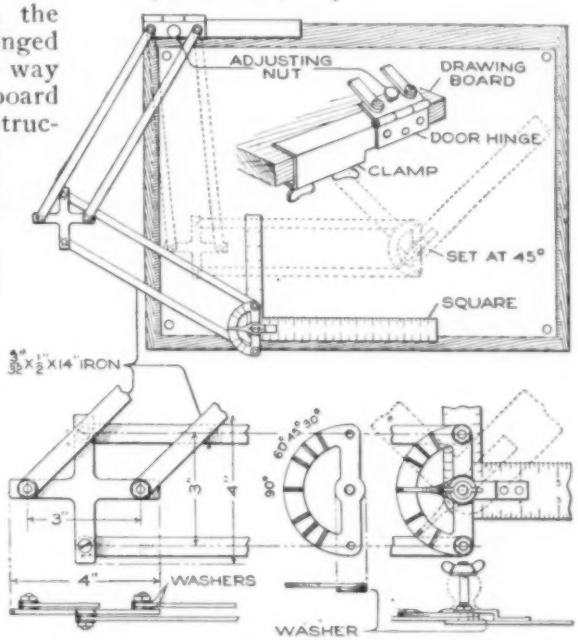
Carburetor Improved by Air-Check Valve Repair

Many carburetors contain an air check, in the shape of a mushroom, which slides on a spindle. With use the hole in the mushroom part becomes enlarged, and the resulting crooked travel of the valve, with consequent air leakage around the hole, makes the mixture imperfect. If the carburetor is adjusted for high speed and heavy loads, the engine runs irregularly when throttled down. Providing a bushing for this valve, or replacing it, usually makes the engine run more smoothly.

A Homemade Mechanical Drafting Machine

The draftsman who is also a fair mechanic will find it worth while to make a drafting machine like that shown, as it is inexpensive and takes the place of most of the common measuring and ruling tools. It is clamped on the edge of the drafting board and hinged so that it can be raised out of the way handily, or removed from the board completely. The details of construction, as indicated, are simple. The parts should be made carefully, however, to insure precise work with this instrument.

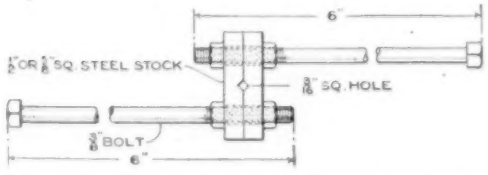
The clamping arrangement is formed of a piece of sheet metal into which two thumbscrews are set. A door hinge is riveted to one end of the clamp, as shown, and an adjusting screw is set in the center hole of the hinge. The parallel arms are made of strap iron, fitted together at the cross as detailed. The radial-gauge fixture requires careful work. Make the protractor of sheet metal, as shown, and file the degree indications into it with a three-cornered file. Make the pointer of a strip of sheet spring brass, and rivet it to a light-weight steel, or other suitable, square. File the pointer to a V-edge, and set it to make a firm contact. Fit the pivot of the radial gauge with a wooden knob and wing nut for adjustment, as shown.—P. P. Avery, Garfield, N. J.



If Carefully Made and Polished, This Drafting Machine will Give Good Service and Save Much Time

Tap and Reamer Wrench Quickly Made

A wrench that is useful, especially with taps and reamers, was made quickly of two bolts, fitted with nuts, and two ½ by ½ by 2½-in. pieces of steel. The square stock was drilled for the bolts and filed to fit the square shank of the tap, or reamer. The bolts serve as handles, and the jaws can be adjusted to various sizes of small, square shanks. If desired, both handles can be set on one side for convenient use in close quarters.

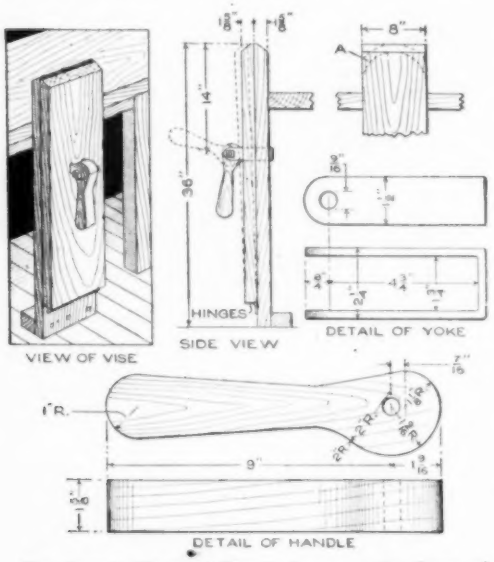


While This Wrench Is So Simple That It can be Quickly Made for Emergency Use, It Is Also Practical as a Regular Tool

Vise for Filing Hand and Circular Saws

It will pay the mechanic who has saws to file now and then to provide himself with a vise suitable for this purpose, and which can be made easily in the small workshop. The vise also has many other uses where thin wood or metal is to be handled. For ordinary handsaws the vise is shaped as shown in the assembly view, and for use with circular saws, a good plan is to round off and bevel the top edge of

the front jaw, as shown in detail, at A. A bolt is passed through the jaws for the center hole of the circular saw.

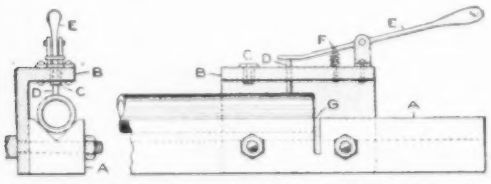


The Saw is Clamped Firmly between the Jaws of the Vise, Which can be Released Quickly by Means of the Cam Handle

The details of construction, as indicated, require a yoke of strap iron. The handle, one end of which is a cam by which the front jaw is clamped firmly at the yoke, should be made carefully to the measurements given. Hard wood is preferable, especially for the handle.

Jig for Drilling Holes in Pipe

This jig was designed for drilling holes in small pipes and tubes. The specific job required that the first hole be a certain distance from the end,



The Pipe is Set in the Jig and the Holes Spaced by Means of the Lever Device

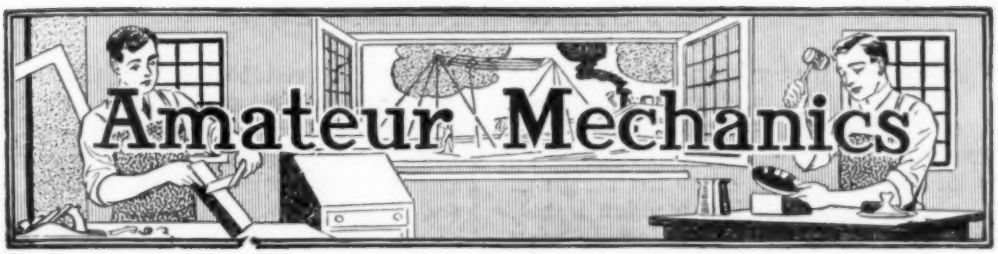
and the other holes spaced uniformly in a straight line. The main part, A, of the jig has a V-groove along its length in which the pipe rests. On the upright B are mounted the drill bushing C and the locating device. This consists of the plunger D, actuated by the lever E and the spring F. A slot is milled across the body, at G. In using the jig, a snug-fitting strip of metal is placed in this slot as a stop for the first hole. Then the strip is removed. When the first drilled hole comes under the plunger D, the spring forces the plunger into the hole, locating the pipe for the next hole. The lever E is then pushed down, raising the plunger, and the pipe is moved until the plunger drops into the hole just drilled, this process being repeated for each hole.

Mask for Small Negatives Printed on Post Cards

In printing photographic negatives, 1⅝ by 2½ in. in size, on post cards, I find that a special type of mask saves much time and trouble. Instead of trying to print several of the negatives at once, I fit them singly into the corner of a mask, which is rectangular in shape and as large as four of the small negatives, one-fourth of the rectangle being cut away. The mask is shifted to expose the four negatives in turn, one at a time. A desirable feature is that the light and dense negatives may be timed properly.—Fred Kuhlmann, Peru, Neb.

Casters on Water Barrels Promote Fire Protection

Large barrels, kept filled with water, are often placed at various points in shops or factories for fire protection. If a fire breaks out some distance from the barrel, it is necessary to carry the water in buckets, and much valuable time is lost. It is a good plan to put four large casters on a wooden frame fastened to the bottom of the barrel. In case of an emergency the several barrels of water in the shop may then be pushed to the fire without trouble or delay.—K. M. Coggeshall, Webster Groves, Mo.

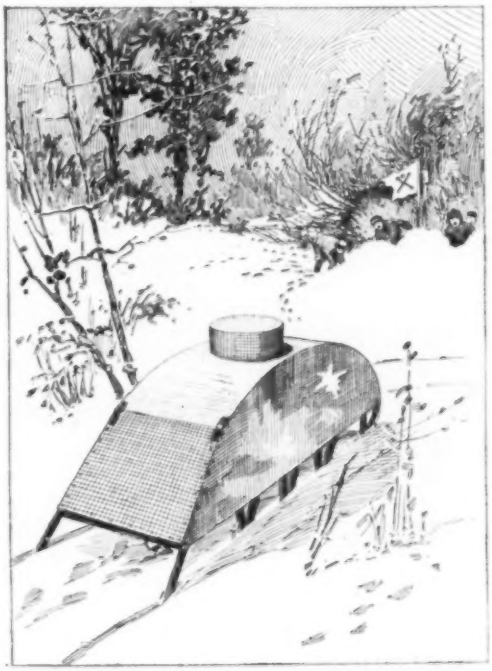


An Armored "Tank" Sleigh

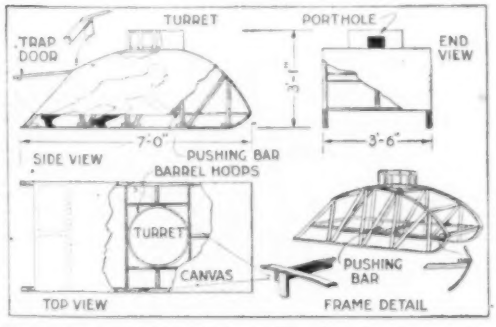
By EDWARD R. SMITH

A SNOWBALL battle is always great sport, but it is all the more exciting if an armored sleigh, like that shown in the sketch, is used by the attacking party against a fort or entrenched enemy. Two or three boys, protected by such a war machine, may creep up in the face of a hail of snowballs. They can see where they are going through a porthole cut in the turret. In case of necessity, the sleigh can serve as breastworks, from behind which the attackers sally forth to charge the foe. After the fight, the defenders and attacking party may change sides, and the fun starts all over again.

The armored sleigh is made up of a framework of wooden strips, over which a covering of canvas, or other suitable material, is stretched. The strips should be about ½ by 2 in. in thickness and width, but ordinary lath, or heavier strips, may be used. The turret can be made from strips and barrel hoops. The strips for the runners and the pieces at the edges of the side frames should be thin enough so that they can be bent, and nailed into place to give a curved edge to the runner, and a curved deck. These



The Attackers Creep Up on the Fort under Cover of the Armored Sleigh, and, When within Striking Distance, Charge the Enemy with Snowball Ammunition



The Framework is Made of Wooden Strips Nailed Together and Reinforced, at the Joints, with Blocks

strips can be steamed, or soaked in hot water, so that they will not break while being bent. It is best to bend them gradually rather than attempt to bring them to the full curve at once.

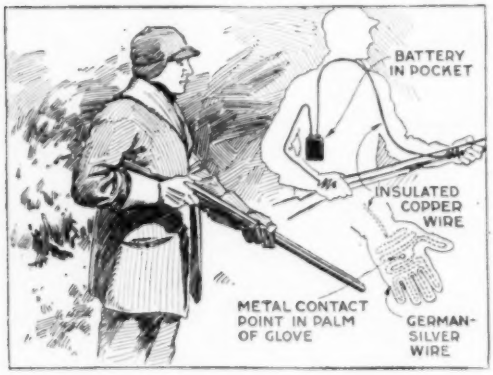
Cut the strips for the runner 7 ft. 6 in. long. Place a runner on the floor, on edge, and fit the strips for the upper edge to it. Make the side 2 ft. 4 in. high, and the turret 9 in. high and 2 ft. wide. Fit the braces into the sides and when they are both completed, set them up, and put in the

crossbraces between them. Then make the turret, and nail it in place between the deck frames, as shown in the top view.

The tank fighters enter the sleigh at the trapdoor. This is a wooden frame, suitably covered, and hinged with strips of leather or canvas, as indicated. An ammunition tray is fitted inside, just ahead of the pushing bar, shown in the detail drawing. Mounted on wheels and painted, this machine makes an unusual float for the "pushmobile" division of a parade.

Novel Electrical Device Warms Hunter's Hands

When the hunter is out on a runway ready for a fox, or other game, he often finds that his shot is bad because of

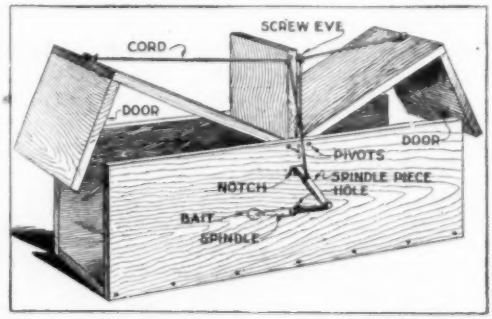


The Hunter can Shoot Readily, Making Use of the Electrical Hand-Warming Device When Desired

cold hands. This is the way I keep my fingers nimble in spite of the frost, when out hunting: One hand is held upon the gun barrel and the other against the lock, as when expecting a shot. The hands make an electrical connection, and a current flows from a battery in a pocket under the right arm, through a German-silver wire threaded in the glove on the right hand, along the metal parts of the gun, back on the wire on the left glove, and into the battery. Wire of No. 30 gauge has just resistance enough to heat slightly when the current passes from a three-cell flash-light battery. Insulated copper wire is used to connect the German-silver wire with the battery. Whenever I do not wish to get the heat from the wire I need only to break the electrical connection by sliding my left hand down upon the wood part under the gun barrel.—F. E. Brimmer, Dalton, N. Y.

A Double-Entrance Box Trap

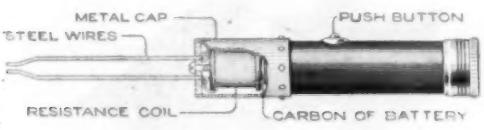
A trap that permits an animal to see a way clear through usually does not arouse suspicion or fear, and the result is that it "brings home the bacon" nearly every time. A simple trap of this kind can be made out of an old box fitted up with a trip arrangement, as shown in the illustration. The ends and top of the box are removed, and then joined as shown. A wooden piece is fixed at the top of the box, across the middle, and supports the trip arrangement. The end gates are pivoted on nails driven through the sides, as shown. A hole is bored through the sides of the box to provide for the bait spindle. This is a stick, about 10 in. long, notched at one end and near the middle. The middle notch rests against the inside of the box, at the hole. A second spindle piece is notched into the side of the box slightly, as indicated, and its lower end hooks on the notch at the end of the bait spindle. The end gates are held up by cords joined to the short spindle piece. When the animal disturbs the bait, the trip is released, and the end gates fall, closing the trap.—B. F. Kirk, St. Paul, Minn.



When the Animal Disturbs the Bait the Trip Arrangement is Released, Closing the End Gates

Pocket Gas Lighter Made from Flash Light

A pocket gas lighter may be made from an old flash light, a small resistance coil, two pieces of wire, and a piece of metal tubing. The cylindrical-type pocket flash light is the best and handiest to use. At the top is fastened a short length of tubing, as shown. A piece of insulating material is forced into the end of the tubing, through which the steel wires pass and to which the coil is fastened. The carbon post of the battery contacts with the core of the coil. The first winding of the coil is attached to the core. The last winding joins onto one of the steel wires, leaving the other steel wire connected to the push button, and the circuit broken in two places. When the burner is to be lighted, the button is pressed. The steel wires touch the metal of the burner, closing the circuit, causing a spark, and igniting the gas.—Edwin G. Gettins, Los Angeles, California.



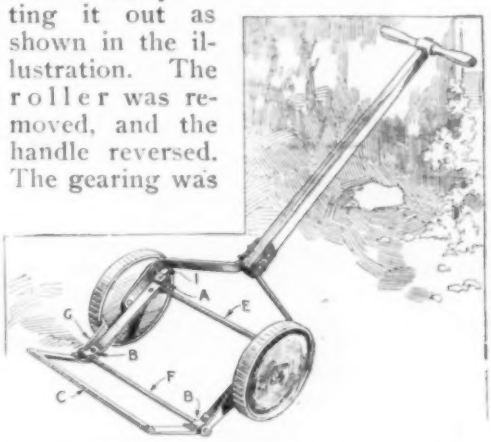
The Gas is Ignited Handily by Means of This Lighter Made of a Flash Light

Guide for Folding Letters Saves Time and Stationery

If letters are folded carefully, it is often possible to economize by using a smaller-size envelope. A handy kink in folding letters uniformly is a cardboard pad somewhat larger than the sheet to be folded, the lines at which the various folds are to be made being marked on the cardboard. A strip of cardboard along one edge of the main piece acts as a guide for the edge of the sheet being folded.—C. H. Anderson, Worcester, Mass.

Hand Truck Made of Old Lawn Mower

A discarded lawn mower was converted into a strong and serviceable hand truck by fitting it out as shown in the illustration. The roller was removed, and the handle reversed. The gearing was removed from the wheels, and the latter arranged to revolve on their axles without the usual connections to the cutter shaft. The fork of the handle was fitted with angle irons, bent from strap iron, as at I. A frame was built of strap iron bent as shown at the sides, and riveted at the joints. Straps of iron were used to clamp the rods E and F, at A and B. The front edge C was beveled slightly so that it can be pushed under crates and other loads. The braces G, formerly used for the wooden roller of the lawn mower, support the rod F.



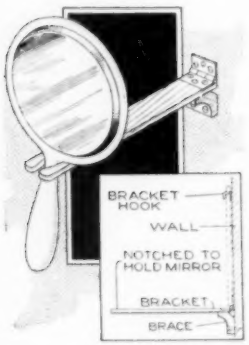
A Lawn Mower was Converted into a Serviceable Hand Truck by Making Simple Fittings for It

Mail-Box Key Kept Handily on Chain at Door

To have the mail-box key always at hand, and yet kept so it will not get lost, as if hung on a nail, I attached a light piece of chain, 4 ft. long, to the key and suspended it from a nail just inside the door near the mail box. When the box is opened, all that is necessary is to let go of the key, and it swings back in place, to be always on the job.—M. T. C., Chicago, Ill.

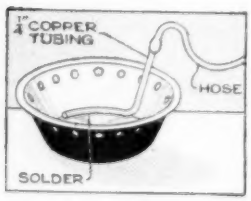
Folding Bracket Support for Shaving Mirror

A hand mirror was used for shaving purposes in a home bathroom, and it was found that the light could not be handily changed to be good for shaving. The mirror was, therefore, fitted to be adjustable for the best light conditions, and the added feature of adjustability to the height of various persons was also included. A wooden bracket was hinged from the wall and the front end notched to receive the mirror, as shown. The strip was braced by a wire which can be easily set at various lengths to raise or lower the mirror. When the mirror is not in use for shaving, the bracket is folded back against the wall, and the mirror is placed on a shelf near by.—John Bustelo, San Juan, Porto Rico.



Overflow Pan for Washing Prints and Negatives

To make this pan, procure a tin dish, 2 in. deep and 8 in. wide, and about 1 ft. of ¼-in. copper tubing. Bend one end of the tube to lie against the inside bottom edge of the dish, as shown, and solder it in this position. Drill ¼-in. holes around the top of the dish, ½ in. from the edge. It may then be painted suitably to protect the metal. A hose connects the protruding end of the tube to a faucet, and the water is directed around the inside of the dish, keeping the prints, or films, agitated, and in fresh water. The holes in the dish provide outlets for the water, preventing the films, or prints, from floating out. They are thoroughly cleaned of chemicals in 25 minutes by this device.—Christian Weyand, Buffalo, N. Y.

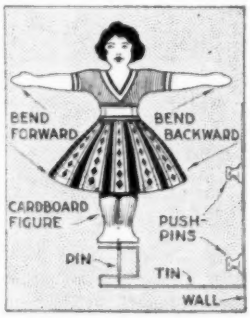


Shoe Soles Cut from Auto Tire Give Good Wear

Having fallen quite unceremoniously down my cellar stairway because of a worn slipper sole, I prepared myself for future trips by having a cobbler fit my slippers with soles cut from an old auto tire. The shoemaker said that in his 22 years' experience it was his hardest job. However, I have a pair of noiseless "antiskids" that will outlast several ordinary shoe soles. This material is excellent, also, for building up heels, especially on heavy work shoes.—W. J. Parks, La Salle, Ill.

A Dancing Paper Doll

To make a dancing paper doll like the one shown in the illustration, cut the figure from stiff paper with scissors. After the face, dress, etc., have been drawn, fasten a pin at the feet by gluing it in place under a piece of stiff paper. A holder for the dancer is made from a strip of tin, about ½ in. wide. Holes are made in the strip, and the strip bent, as shown, to receive the pin, and to hold the doll upright. The pin fits loosely, so that the doll can turn freely.



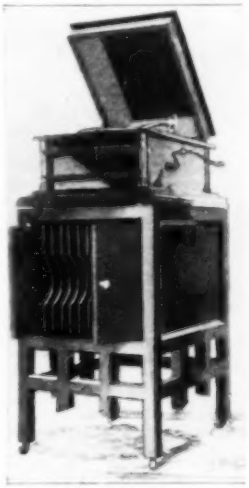
Attach the holder to the wall above the radiator or hot-air register. To make the doll turn, the arms are twisted, as indicated. The corners of the skirt are also bent. When placed in the holder, the doll will dance merrily, if there is a sufficient current of hot air rising.—A. J. Viken, Waterloo, Iowa.

Portable Stand and Record Cabinet for Talking Machine

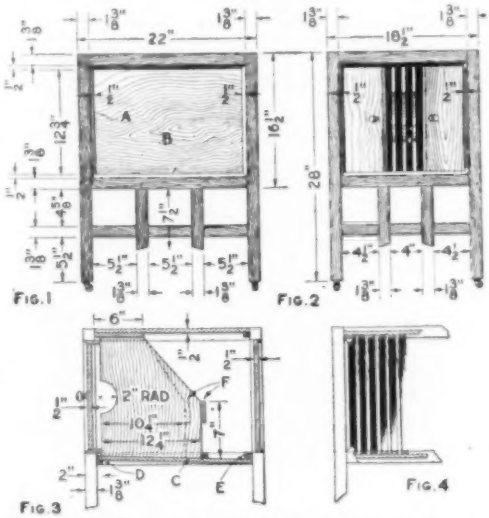
By S. H. JOHNSON

AN attractive cabinet which takes care of the disk records for a talking machine, and provides also a portable stand for it, was built of old cabinet lumber. The stand, as shown, varnished and rubbed down to a good finish, makes a useful and worth-while piece of home-furniture construction. The details of the job are simple, as shown in the working drawings, Figs. 1 to 4. Fig. 1 shows the side elevation with the full panel and the framework; Fig. 2 is a front view. A sectional view from the side, showing the construction of the interior partitions for the records, is shown in Fig. 3, and a front view of the partitions, in Fig. 4. The stand may be finished in various ways to suit the wood used. Hard wood is preferable, and may be finished readily to harmonize with other furniture in the room. The size of the stand will depend somewhat on the kind of talking machine to be set upon it.

First get out the stock for the framework, and fit up the joints, which may be doweled or mortise-and-tenon. Fit the panels into place and then join the frame with glue, permitting it to dry before working with the sections again. Make the side frames first, and set the front and back frames and back panel into place between them. Nail small strips around the panel openings at the inside, as a backing for the panel B. These are fitted into place with small moldings, A, mitered on the outside of them after the interior has been completed.



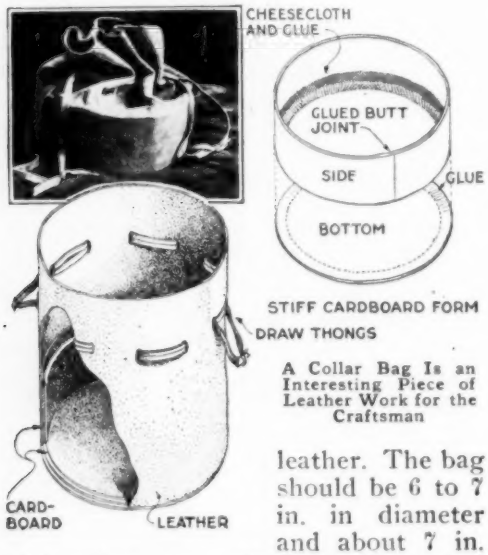
The construction of the top, which is of ½-in. wood, is shown in Fig. 3. It is supported on heavier strips, set around the inside of the top frame, and on the case which holds the records. This case can be built as a unit and set into place before putting on the top and panels finally. Fit the bottom C, setting it on a slant and nailing it to the strips D and E. The pitch of the bottom prevents the records from rolling out. The partitions are of ¼-in. soft wood, shaped as shown, and set ¾ in. apart. If the records are of different sizes, strips should be fitted as at F, setting one strip forward to provide for the smaller records. The doors are of ½-in. stuff, preferably three-ply. When the interior fittings are complete, they should be sandpapered and given a coat of shellac before fitting them into place. The top, panels, and doors are then fitted, and the cabinet is ready for the exterior finish, in wax, varnish or other suitable effect. The interior is best left unfinished, except at the front edges, which are finished like the exterior.



The Construction is Simplified by Setting the Panels into Place with Moldings Instead of Grooving the Frames for Them

A Suède-Leather Collar Bag

A practical piece of leather work for the home craftsman, and which makes a useful gift, is a collar bag of suède



A Collar Bag Is an Interesting Piece of Leather Work for the Craftsman

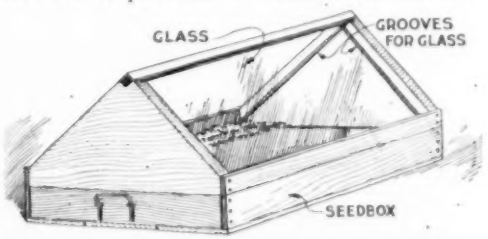
leather. The bag should be 6 to 7 in. in diameter and about 7 in. high, when open. First make a form of stiff cardboard, over which the leather is glued. Cut a cardboard disk for the bottom, as shown, and make a ring of cardboard, 3 in. high, to fit around the bottom, and joined in a butt joint, the ends of the cardboard fitting against each other. The joint is reinforced by gluing strips of cheesecloth on each side of it. Reinforce the corner joints at the bottom similarly, as shown. Fit the leather over the form, sewing it together carefully at the seams. The sewing may be made ornamental with fairly large stitches on the outside. The lower edge of the leather is notched, folded under the edge of the form, and glued into place. The bottom is then covered with thin leather, or cloth. The inside can be finished by covering the cardboard form with silk, or other suitable material. This may extend only to the upper edge of the form, or nearly to the upper edge of the leather. If only the form is covered, the lining should be put in place, folded, and glued at the top edge of the form before the outer leather is applied. The drawstrings, or thongs, are laced completely around the bag, to draw from opposite sides.—Livingston Haviland, Buffalo, N. Y.

Door Knob Used as Valve Wheel and Wrench

An ordinary door knob that has the usual square socket for fastening, can be used as a socket wrench, or as a valve wheel, permanently fixed or slipped into place as needed. A knob of this kind was used as a detachable wrench on the garden-hose faucet, set in the basement wall on the outside. The wrench was tied to the end of the hose and was always handy when needed.—Herault Trester, Milwaukee, Wisconsin.

A Sun Trap for Germinating Seeds in Boxes

A miniature hothouse, known as the sun trap, can be used to good advantage in germinating choice seeds for the flower garden in small boxes. It can be made in various sizes, the 12 by 18-in. size being best suited for ordinary use. The end pieces are made of ¾-in. wood and are fastened together by sides and a bottom of ½-in. strips. The roof consists of two pieces of window glass which slide in grooves, cut in the end pieces parallel with and near the upper edges. The ridgepole rests loosely in position, and may be removed to provide an outlet for the air.



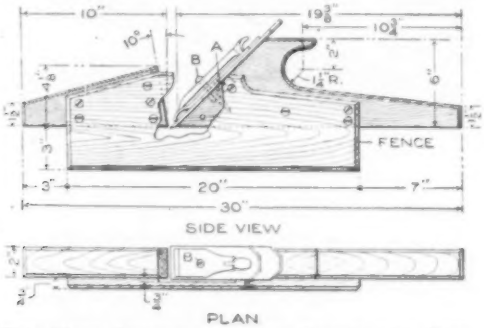
Choice Seeds can be Germinated Conveniently in the Home by the Use of This Sun Trap

One of the glass panes can also be slipped up at the bottom to permit fresh air to enter.—F. E. Tuck, Nevada City, Calif.

Jointer Plane Inexpensive and Easily Made

By using the homemade jointer shown in the sketch, boards up to 2 in. thick can be planed to a true, square edge quickly. An old plane iron and lever cap are used for the cutter fittings. The plane is made from a 2 by 6 by 30-in. board. First shape the piece, as shown, and true up the sides and bottom perfectly square to each other. Round off the handle portion. Saw out and true up the opening for the cutter. The angle of the rear part should be 45° and that of the front part 10°. Mark the location of the cap screw A, and bore a mortise to receive it. Mark the location of the lever-cap screw B, and drill a hole for it, setting it firmly, yet adjustably.

The cutter should be a little wider than the thickness of the stock used in making the plane, so that it will overlap the plane on the left side, a mortise



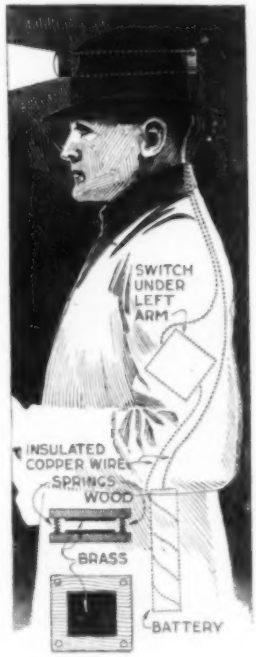
This Plane Squares and Joints Boards with Ease, Because of Its Length and the Wooden Contact Surfaces

corresponding exactly with the opening in the plane body and ¼ in. deep being made in the fence. The fence is made of ¾ by 7 by 20-in. stock, and extends 3 in. below the plane.

To assemble the parts, place a straightedge on the bench, put down the two pieces of the plane with their bottoms against the straightedge, and adjust them so that, after allowing for the cutter, the remaining opening will be a good 1/16 in. wide. The cutter must be set by hand, or with a hammer, as in the old-style planes.—Henry Simon, Laguna Beach, Calif.

Hunter's Headlight with Switch under Arm

A device which a hunter or woodsman will appreciate especially, and which has uses for others, is a headlight, fitted into the hat and controlled by a switch under the left arm. This arrangement permits both hands to be free, which is a great convenience. A three-cell flash light of the cylinder type was used. It was fitted through an old derby hat, as shown, and the wiring connections made to the battery in the coat pocket. The switch under the left arm was made as detailed. Four coiled springs were mounted between two plates of wood. On these, brass pieces were mounted, as shown, and connected in the circuit. By a slight pressure, the plates are brought into contact, completing the circuit and lighting the flash light. The springs keep the switch open ordinarily. A handy feature of this flash-light arrangement is that the beam of light is directly ahead of the hunter whenever he turns his head.—N. F. Dolan, Cleveland, Ohio.



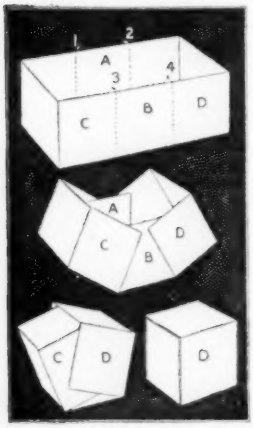
Lubricating Screens and Window Sash with Paraffin

To make a sliding screen or a window sash move easily, rub a paraffin candle along the edge which is likely to bind. This is an effective lubricant that lasts a long time and is easily replenished. A good plan is to go over all the troublesome sashes before the

cold weather sets in, and especially to paraffin all the screens before they are set into place in the spring.—J. A. Ryan, Buffalo, N. Y.

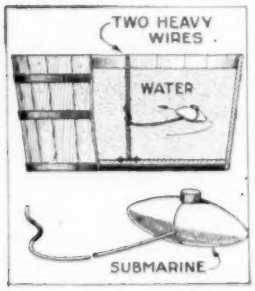
Small Mailing Boxes Made of Match Carton

Frequently a small box is needed for mailing purposes, and usually none can be found. By taking the inside half of a match box and cutting on the lines 1, 2, 3, and 4 and then bending it successively into the shape shown, a neat box and lid will be formed. The letter indications show the bending of the corresponding parts of the original box, forming a strong, compact protection.—K. M. James, Pittsburgh, Pa.



A Submarine Toy in a Tub of Water

When placed at the bottom of a tub of water, the submarine shown in the sketch pursues a helical course to the surface. A spiral rod, made by twisting two heavy wires together, is fixed to the bottom of the tub in a vertical position. The model submarine of light wood, or formed of two tinned-metal cones, is fastened to the end of a wire arm which is bent to turn about the spiral rod. The turning end of the arm should be loose enough to be pushed down the rod, yet tight enough to grip it coming up. Thus the buoyancy of this tub toy is its motive power.

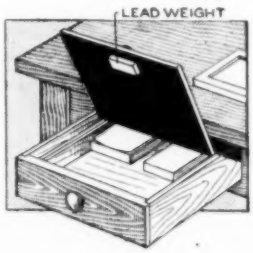


Cleaning a Plaster Cast

To clean a plaster cast, immerse it in a saturated water solution of gypsum This may be obtained by placing some gypsum, or plaster, in a vessel and covering it with water; after a day or two the clear water may be drawn off, and in this the plaster cast is placed. After a few hours, brush off the cast while still in the water, using a stiff brush.

Weighted Drawer Cover Protects Photo-Print Paper

I found that when I kept my photographic printing paper in an open drawer while making a batch of prints, I often forgot to close the drawer when turning on the light, consequently ruining some of the paper. As a remedy, I fitted a piece of light wood, as a cover, inside of the drawer. I painted it a dull black, and hinged one end to the back of the drawer. On the other end, I fastened a small weight of lead, and screwed a knob on the top. Across the front of the inside of the drawer, I nailed a small strip of wood, on a level with the hinges at the back, so that the cover would lie flat. When I take a sheet from the drawer, the cover falls back, so that without closing the drawer, the paper is protected from the light.—Joseph Thalheimer, Jr., Venice, Calif.



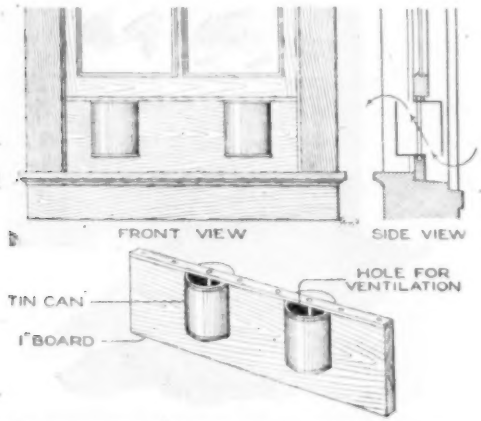
Bed Comforter Made of Newspapers and Cheesecloth

A kink in making the camper's cot comfortable is also useful many times in the home. Paper offers great protection from the cold, and a comforter or blanket made of newspapers, properly sewed into a cheesecloth or other substantial covering, is a cheap and ef-

fective article of bed clothing. The comforter is made by cutting sections of the cloth of suitable size and placing the newspapers in single layers to the desired thickness upon it. The covering layer of cloth is then put on and the edges sewed up. With a large darning needle and twine the edges may be whipped over easily, and stitches may be taken through the comforter at various places like the tying of a quilt, if desired. This pad is especially good as an under protection on a camp cot, but may be used as a covering also.—T. J. Hubbard, Mendota, Illinois.

Window Ventilator Fitted with Tin Cans

An inexpensive ventilator for the sliding-sash window can be made out of a board and two tin cans, arranged as shown. One-half of the top, and the opposite half of the bottom, on the other side of the can, are cut out as indicated. The board is fitted closely into the window opening, and should be about 10 in. high. The cans are fitted into the board, and a strip nailed over them. The outer sides of the cans are open at the bottom and the



This Simple Type of Homemade Window Ventilator Shuts Out Rain and Snow and Provides Ventilation without a Draft

inner ones at the top, as shown in the side view, the direction of the air current being as shown by the arrows.—William Freebury, Buffalo, N. Y.

Padded Soap Box Makes Safe Baby Swing

For this safe and convenient baby swing, a soap box 18 by 18 by 8 in. deep was used. Two circular holes, 4 in. in diameter, were cut in the bottom, as shown. These are to accommodate the baby's legs

Baby cannot Ordinarily Fall Out of This Swing, and Finds Much Recreation Playing and Swinging While Mother Works Near By

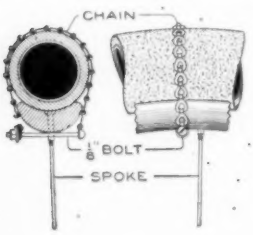
when sitting in the swing. The bottom and sides are padded and lined. Brass-headed tacks hold the lining in place. The outside of the box is stained a dark shade. Four cords, attached to cleats, hold the swing suspended from two hooks in the ceiling, and keep them clear of baby's fingers. The swing is adjusted in height so that baby can just reach the floor with his feet, and he can thus move the swing about and strengthen his legs.

Old Shovel Handles Put to Practical Uses

It is worth while keeping old shovel and spade handles, for they come in handy in the home workshop and in the garden. A good use for a strong handle of this kind is in making a grab-hook handle. The end of the shovel handle may be cut off to provide a grip for a door or tool chest. If a part of the handle shaft is left on, it may be sharpened into a useful dibble for planting in the garden or greenhouse.

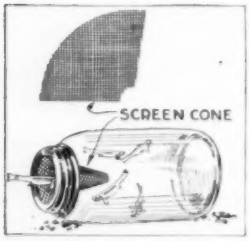
Nonskid Chains for Bicycle or Motorcycle

By the application of short lengths of small galvanized-iron interlocked chain, looped around the tire and rim of a bicycle wheel, and fastened at the bottom with bolts and nuts, as shown, practical skid chains are provided. Place about eight of these on each wheel, and no difficulty will be encountered in riding the machine over snowy or icy roads. As the chain lies flat on the tire, and the bolt is of a length less than the diameter of the tire, the chains or bolts will not strike the frame or mudguards as the wheel revolves.



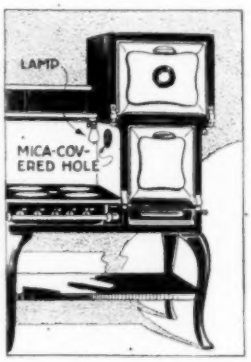
Minnow Trap Made of Fruit Jar

The minnow trap shown in the sketch can be easily made from an ordinary screw-top fruit jar. The top of the cap is cut out, and in its place is put a wire-screen cone. To shape the cone, cut a section of screening as shown in the pattern layout. The length of the circular arc should be slightly greater than the circumference of the hole in the cap, so as to allow for overlapping the edges of the netting when forming the cone. When formed, the cone may be soldered, or stitched with strong twine, along the overlapping edges, and likewise fastened to the cap. The point of the cone is cut off to form a small hole, through which the minnows can enter the trap, but once in, they cannot readily find their way out.—F. W. Buerstatte, Pullman, Washington.



Lighting Inside of Bake Oven Is Handy Kink

One of the inconveniences of baking is the lack of illumination in the oven, thus necessitating the removal of the food for inspection. This delays baking, cools the oven, and wastes fuel. Artificial lighting overcomes this trouble. A hole, 4 in. in diameter, is cut through the side of the oven, and the aperture covered with a thin sheet of mica, or wire glass, fitted in a frame and bolted to the oven. A porcelain incandescent-lamp receptacle is fixed to the stove, so that the light rays will be directed through the hole and into the oven. In wiring the lamp it is best to use asbestos-covered wire. Metal clamps hold the wires, run so as not to be easily damaged.—K. M. Coggeshall, Webster Groves, Mo.



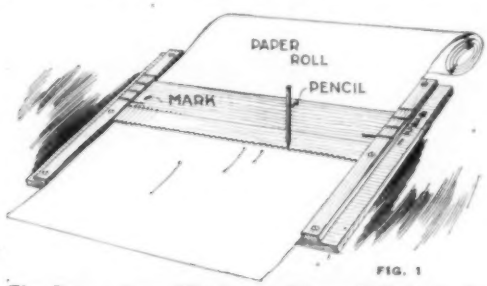
Water-Glass Holder Made of a Muffin Tin

A water-glass holder, enameled and decorated like those sold in novelty stores, was quickly made of a muffin tin at a cost of 35 cents. The handle may be of wood, which, when painted, will present a satisfactory appearance, or a tinsmith can easily provide a handle made of metal. Black enamel is suitable, and flowers or other decorations may be made as desired. The holder is useful especially for porch and out-of-door service, but may be used indoors as well.—Adelyn Joseph, Chicago, Ill.

Cutting Homemade Rolls for the Player Piano

The cutting of rolls for a player piano is an interesting process, and is more simple than may first appear. A selection can be permanently cut in paper, and with almost the same touch that the player would execute it himself upon the piano. The necessary tools can be made at home, and the cost is slight.

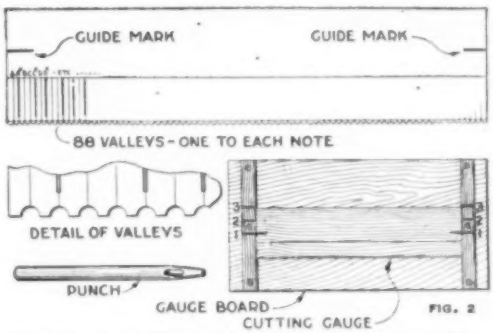
First, determine the latitude of the player, whether a 65, an 88-hole, or other type of player. Count the holes in the suction board carefully, and determine what note the extreme left hammer strikes. This note is taken as a starting point on the tabulator of the cutter, so it is important that it be correct. Suppose, for example, rolls for an 88-note player are to be cut, the lowest note being A in the bass. Take that note as a starting point. First make the cutting gauge, shown in Fig. 1, and detailed in Fig. 2. This is made of thin, hard, close-grained wood with one perfectly straight edge. The length of the piece, between the side guides, should



The Paper, from Which the Player Roll is to be Made, is Mounted on the Gauge Board, between the Guides, and the Gauge Placed over It

be exactly the width of a roll. Lay the gauge along the suction-hole bar on the piano, and with a sharp-pointed pencil mark the gauge, with reference to the holes, as shown above, in Fig. 2. Then, with a sharp knife or round file, cut out the valleys as even as possible, the whole length of the bar. With pen and ink, draw a line, about 1 in. long, from the center of each valley, and letter these lines according to the keyboard of the piano. The black keys may be emphasized by a heavy double line, and the white keys by a single one. Make certain that the ends of the gauge are exactly square and smooth.

The gauge board, on which the gauge proper is set, as shown in Fig. 1, consists of a smooth board with two side



Details of the Gauge Board, the Gauge, the Note Indications, and the Cutting Punch

guides, in which the gauge slides. Fasten two cleats on the bottom to prevent the board from warping.

A round punch, as shown in Fig. 2, that will cut a hole the width of the slot in a regular player roll, is also needed.

The process of cutting a roll is as follows: Procure a roll of stout manila paper, the width of a regular player roll, and place it upon the gauge board, as shown in Fig. 1. Lay the cutting gauge over it, between the guides. Make a guide mark on each end of the cutting gauge, 1 in. from the teeth, and make a corresponding mark on each of the guides. On the right-hand guide lay off three 1-in. spaces. The three spaces represent one bar of music, in three-fourths time, each space representing one quarter note. It is easy to lay out spaces for music in various kinds of time, by keeping in mind the relative distances required by the fractional notes, sixteenths, eighths, etc., to make up the measure.

Place the music score conveniently at hand, and mark the indications for the first bar. Suppose the first note is a quarter-note C. Slide the cutting gauge down until the mark on the end comes opposite the lowest mark on the

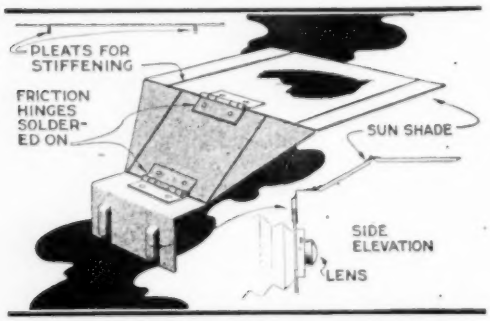
guide, at 1, and with a pencil make a dot on the paper opposite C on the scale. Hold the lead of the pencil against the hollow in the gauge. Then move the gauge up until the mark on the end comes opposite the mark 2 on the guide—a quarter-note space—and make another dot at note C. Connect these two dots with a straight line. When by this process, a measure is completed—the equivalent of three quarter notes, in this instance—the paper has been moved a measure's distance. Start on the next measure, completing it in the same way. Anyone with a fair knowledge of music reading will quickly master the method, after indicating two or three measures, in which are included a variety of notes, rests, and other figures.

When the paper is completely marked, roll it back to the beginning, and with the punch and a light hammer, punch out each line its exact length, cutting on a solid foundation of hard wood. At the proper points mark the accents, and other special indications, and the roll will be ready for attachment to the spindle. Cut the end at the beginning of the roll to a point, and glue on a small metal ring, so it can be hooked to the roller of the player, or provide the type of fastening necessary.

A short, simple selection should be undertaken at first, until the method is mastered. Then more difficult selections can be attempted, and much pleasure derived from the work. Mistakes in the cutting can usually be rectified by pasting heavy tissue over that section, and cutting the note in the right place.—L. B. Robbins, Harwich, Massachusetts.

Hood Shades Camera Lens from Sun

In taking pictures, it is often desirable to secure backgrounds that make it necessary to point the camera in the



A Homemade Shade of This Type, Fitted at the Front of the Camera, Aids the Amateur in Taking Pictures in the Direction of the Sun

general direction of the sun. Amateurs find this method difficult. By the use of a shade for the lens, as shown in the sketch, photographs can be taken easily under these conditions. The shade is made in various sizes to fit the cameras, as required. A good size for a small, or medium-sized, camera is about 2½ by 1½ in. for the front folding section. The three sections are hinged together, as indicated, and the device is set on the lens plate, by means of small clips, formed by cutting four slits into the first section and bending the resulting strips into a hook shape, as shown.—Howard Scott, Jersey City, New Jersey.

Skates Dried Quickly by Dipping in Hot Water

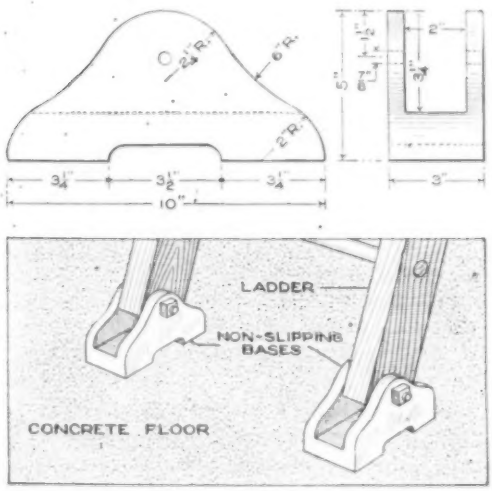
At first thought, the idea of drying ice skates by immersion in a tank of hot water appears rather nonsensical, but such a method is employed effectively in one of the large skating rinks in San Francisco. The patrons, upon removing their skates, dip them in a tank of boiling water, and shortly after their removal from the water, the skates are dry and clean. Upon immersion, the steel of the skates absorbs considerable heat from the water, and this heat is sufficient to cause evaporation of the moisture that remains on the skates.—H. A. Eveleth, Berkeley, Calif.

Runner Fitted to Wheelbarrow for Winter Use

Anyone who has tried to wheel out a load of ashes or other material with a wheelbarrow, over snow or rough icy ground, can appreciate how inconvenient a job this is. By fitting the wheel of the barrow with a wooden shoe, shod along its lower edge to provide a good runner for use on ice and snow, the wheelbarrow is nearly as handy in winter as in other seasons. The runner is fastened to the wheel, and should be arranged so that it can be removed quickly by releasing the bolt fastening.

Nonslipping Base for Ladders Used on Concrete

Ladders used on concrete floors, without some safety device for preventing them from slipping, often result in serious accidents. In a large railroad shop a standard type of base made of basswood was fitted to the ladders and proved effective. The bases, as detailed in the illustration, give a considerable bearing surface,



The Wooden Bases Have a Large Bearing Surface, and do Not Slip Easily on Concrete Floors

and adjust themselves to irregularities in the floor. They are pivoted on the lower ends of the ladder by means of bolts.

Old Fishing Boats Converted into Cozy House Boats

Many duck hunters and fishermen of the San Francisco Bay region have found that a discarded salmon-fishing

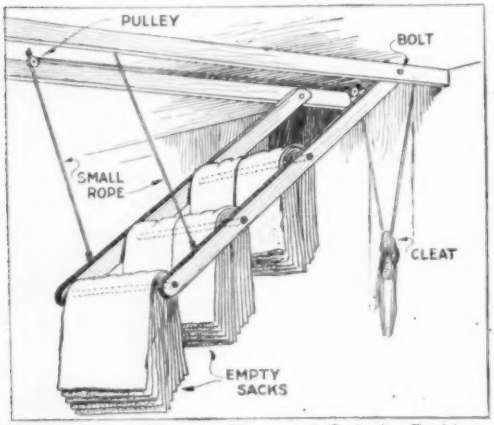
This Practical House Boat was Rebuilt from a Salmon-Fishing Boat at Small Cost

boat is an ideal craft from which to build a house boat, and each year finds more of these craft being so converted. They are flat-bottomed, pointed at both ends, and are about 24 ft. long and 6 to 7 ft. wide. After several seasons' use they are sold, often at a reasonable figure. The hulls are made watertight, painted, and repaired, and a cabin, 12 to 15 ft. long, is built on. The house boat shown in the photograph has plenty of head room, and is divided into a bedroom and a kitchen. The interior is finished and papered, and is fitted with a bunk, a sink, and a stove. Such a boat affords the hunter or fisherman a place where he can rest, sleep, eat his meals, change his clothes, and store his equipment.

Empty Sacks Kept Safely on Ceiling Rack

Farmers and others who use sacks of good quality for their products often fail to care for them properly, with the result that rats and mice chew holes in them. It is well worth while to make a convenient rack for storing these empty sacks in some convenient place in the barn or granary. The rack shown in the sketch was made of two strips of wood and several short

lengths of broomsticks. The strips and the broomsticks were made into a short ladder and this was fastened on bolts, at the upper end, as shown, and

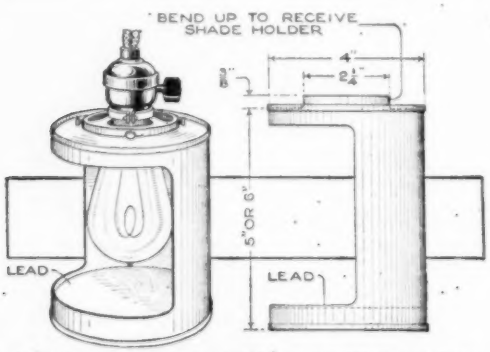


The Sacks are Kept in Clean and Orderly Fashion, Safe from Rodents, on This Ceiling Rack

suspended from the rafters. A rope-and-pulley arrangement is the means of raising and lowering the rack.—T. H. Linthicum, Annapolis, Md.

Portable Weighted Electric Light Made of Tin Can

The feature of this homemade, portable light fixture is that it is weighted so that it can be set down, making it unnecessary to hold it, as is the case

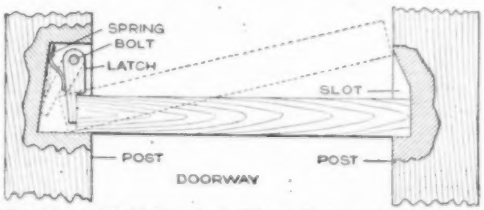


This Lamp can be Set Safely on Its Weighted Base, and the Shade can be Removed Like That of an Ordinary Light

with most lights of this kind. The shade for the light is made of an ordinary tin can, into one side of which an opening is cut, as shown. An opening for the light fixture is cut in the top of the can, and a ring is shaped around the opening, to fit the shade holder, by bending up the edge around the opening. The bottom of the can is filled with melted lead, providing a weighted base.

A Bar Lock for Open Passageways

A substantial door bar for barn doors, passages, or elevator entrances is easily made and put in place. The sketch shows a view of this bar across a doorway. A slot, or mortise, is cut into one doorpost to take the swinging spring latch, pivoted in the post on a bolt. In the opposite post a mortise is cut with its top edge slanting, as shown; the bar, of a suitable size, is placed in position by setting one end in the larger mortise, pressing back on the spring latch, and dropping the other end into the smaller mortise. To



The Bar is Held Firmly in Place, Yet can be Removed Easily by One Familiar with Its Operation

remove the bar, push it against the latch, and lift out the other end of the bar first.

Renewing Efficiency of Automobile Tire Pump

After an automobile tire pump has been in use for some time it loses some of its "pep" and requires several times the number of strokes to get the same amount of air pressure that it did formerly. This can be easily remedied by removing the leather disks from the pump plungers and soaking them in neat's-foot oil for a half hour. If the leathers are badly worn, they should be replaced. Sometimes the trouble can be partly remedied by putting a few drops of oil in the cylinders, the oil being absorbed by the leather.

A Sensitive Mirror Galvanometer

By JOHN D. ADAMS

A STANDARD instrument, used in electrical work, and which the amateur can construct to good advantage, is the mirror galvanometer. In the galvanometer shown in Fig. 1, the current generated by touching a drop of salty water with the point of a steel needle and the end of a copper wire throws a spot of light violently across the screen. This type of instrument consists of a coil of wire, in the center of which is suspended two or three minute magnets attached to the back of a small mirror, which reflects a spot of light from a lamp onto a suitable screen, arranged as indicated in Fig. 2. Upon the passage of current through the coil, the magnets are deflected, and any angular movement of the mirror will be greatly amplified on the screen.

Begin the construction with the paper tube upon which the wire is to be wound, made from a strip of cardboard, about 2 in. wide. While this is hardening, the square wooden ends of the bobbin may be made. In order that the coil may be divided into two parts to allow the suspension fiber to pass through, a wooden central disk, as detailed, must be prepared, with a hole in the center of the same diameter as those in the bobbin ends. From this hole outward, a slot is cut at the top of the disk, as indicated. Cut a square hole at the middle point of the paper tube, and glue the center disk in place, making sure that the inner end of the slot in the disk and the square hole in the tube register exactly, and that the disk stands at right angles with the tube. The two wooden ends may now be glued on, and the whole set aside to dry while the base block is made ready. This should be of the same variety of hard wood as the bobbin ends. Drill the screw holes accurately, after which the three leveling screws should be arranged for.

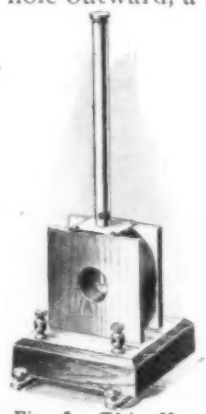


Fig. 1. This Neat Galvanometer Is of Comparatively Simple Construction

The bobbin will be dry by this time. Clean off superfluous glue, and paste a

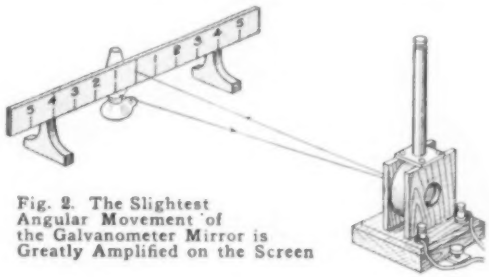


Fig. 2. The Slightest Angular Movement of the Galvanometer Mirror is Greatly Amplified on the Screen

piece of strong paper on each side of the center disk to close in the slot. The wire may vary from No. 30 to No. 36 gauge, the finer being the more sensitive. When one side is wound even with the center disk, wind the other in the same direction. When the second side is full, cover neatly with imitation leather, in which a hole should be made directly over the slot in the center disk. The bobbin may now be screwed to the base, and the connections made to the binding posts.

Procure, next, a ½-in. brass tube, about 6 in. long, and trim the ends squarely. Make a small rectangular brass plate, shown on top of the bobbin, and drill it for four screws, with a large central hole to receive the lower end of the vertical tube. This should then be soldered in place. Drill the four sight holes in the lower end of the vertical tube at a point slightly above this plate, so that the position of the suspension fiber may be readily observed. Attach the plate with roundhead screws, and then provide a smoothly fitting wooden plug to fit the top of the tube. Drill a small hole through the center of this, about the size of the end of a round toothpick.

The moving mirror device is made next. Cut a disk, ¾ in. in diameter, from a calling card, and to it attach with shellac, three small pieces of steel taken from the mainspring of a watch, first magnetizing them strongly. These

magnets are arranged parallel and slightly apart. On the reverse side, attach a piece of mirror glass, about ⅜ in. square. A small concave mirror would, of course, be preferable. Unravel a silk thread until a long, delicate fiber is secured. Attach this to the top of the paper disk so that the magnets will hang horizontally. With a thread, fish the other end through the vertical slot between the two coils, up the brass tube, and through the small hole in the wooden plug at the top. Draw up the slack and make the fiber fast by inserting the end of a round toothpick. Make the final adjustment by moving the plug up or down in the brass tube. Adjust the leveling screws until the fiber hangs centrally, as observed through the sight holes. The arrangement of the lamp and screen is shown in Fig. 2. It should be kept in mind, that light is reflected from a surface at the same angle at which it strikes.

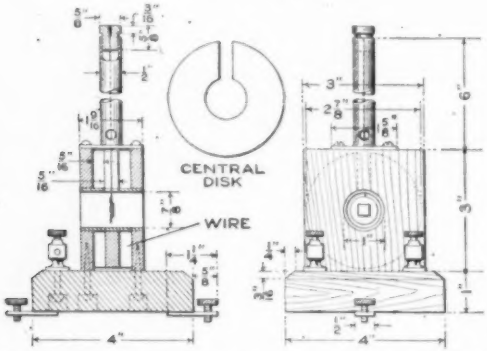


Fig. 3. The Instrument is Leveled so That the Suspended Fiber Is in the Center, as Seen through the Sight, and the Deflections of the Suspended Mirror are Observed

Rolling Up a Soft Hat Handy Kink for Travelers

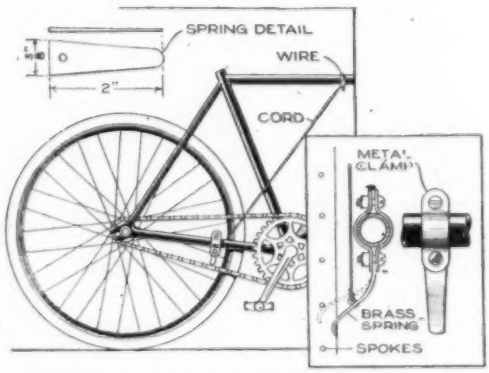
How to carry an extra hat while traveling with only a hand bag is a problem that thousands of persons meet frequently. I have found the plan of carrying a soft silk hat and one of soft felt of the fedora type to be the handiest. In rainy weather I wear the felt hat with my raincoat and easily roll up the silk hat, which takes little space in the hand bag. When I am wearing the silk hat I roll the fedora up as follows: The crown is smoothed out and the rim carefully turned down as the hat is pressed together. It is then made into a soft roll of conical shape, and tied with a string or rubber band. If carefully done, and the felt is of the right kind, this rolling will not injure the hat.—Joseph H. Miller, Baltimore, Md.

Pull Cord on Extra Blanket at Foot of Bed

A handy arrangement of an extra blanket or comforter, placed at the foot of the bed, will be appreciated especially by a patient who finds it uncomfortable to reach for the extra covering. It is prepared as follows: One end of the blanket is tucked under the mattress at the foot of the bed. The blanket is then folded over the end of the bed in such a way that when the top layer is pulled forward the others will fold out gradually as required. By fixing a cord to the free end of the blanket the latter can be drawn over the bed by pulling on the cord.—R. F. Binney, La Vina San, Pasadena, Calif.

Novel Bicycle Alarm Signal

A bicycle alarm signal which a boy can make easily requires only a piece of cord, a piece of wire, and a strip of thin spring brass or sheet metal, shaped as shown in the spring detail.



A Screeching Sound That Attracts Immediate Attention is Produced When the Cord is Pulled

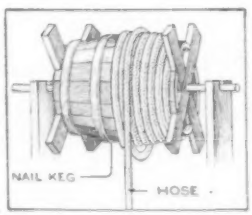
When the cord is pulled, the spring rubs against the steel spokes, without injuring them, and causes a screech which attracts immediate attention. The cord is fastened to the upper bar of the frame with wire. The spring is held in a clamp made of two strips bolted around the lower part of the frame, as shown in the detailed drawing.—P. P. Avery, Garfield, N. J.

Chiffonier Used as Trousers Press

Living at a boarding school and having to take care of our clothes more or less ourselves, we make use of a little scheme for keeping our trousers in shape, with the aid of the chiffonier. The trousers are neatly folded at night, the cuffs slipped into the top drawer of the chiffonier, and the drawer closed just enough to hold them. The waistband of the trousers is similarly tightened in the lower drawer, and by drawing out the center drawer, the trousers are held stretched. This gives a neat crease, although the crease can be preserved considerably by merely suspending the trousers from the top drawer of the chiffonier.—T. D. and P. H., Lakeville, Conn.

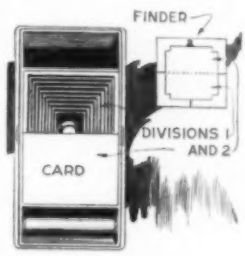
Nail Keg Used as Reel for Hose or Wire

Where a number of reels for barbed or other wire are needed, or where cheap reels for hose are required quickly, a good method is to make them of old nail kegs. The ends of the kegs are notched, as shown, and cross arms of ⅞ by 2½-in. wood fitted and nailed into the notches. Holes are bored through the center of the cross arms, through which a shaft, or pipe, is passed as a bearing, if needed. Various similar uses for nail kegs will suggest themselves readily.



Twelve Small Pictures Made on Six-Exposure Film

An interesting and economical method of taking pictures is to use only one-half of the usual exposure area, making two smaller pictures instead of the one of the regular camera size. The method for a roll-film camera is typical and can be adapted for others: Open the back of the camera and before loading it, place a piece of black cardboard, exactly half the size of the exposure opening, tightly into the lower half of the opening, as shown. Next, by a slight mark on either side, divide the finder in two, to correspond to the exposed and covered halves of the exposure opening at the back of the camera. Hold the camera as for a vertical picture and number the lower half of the finder 1, and the upper half 2, as indicated. Turn the camera horizontally and mark the left half of the finder 1, and the right half 2. When taking a picture with the card in the lower half of the exposure opening, the image is seen in the part of the finder numbered 1, and the reverse, when the card is reversed.



When the first series of exposures is made, unload the camera. Load the camera in the usual fashion with the used film. Rewind this film on the winding spool. Remove the resulting cartridge, and load it into the camera as if it were a new film. When the second six exposures are made, unload the film, which may then be developed. This method is really quite simple, and many good pictures were made in this way with an ordinary film camera. —Joseph S. Robinson, Marblehead, Massachusetts.

¶Salt sprinkled along the window sill under the sash will prevent it from freezing quickly.

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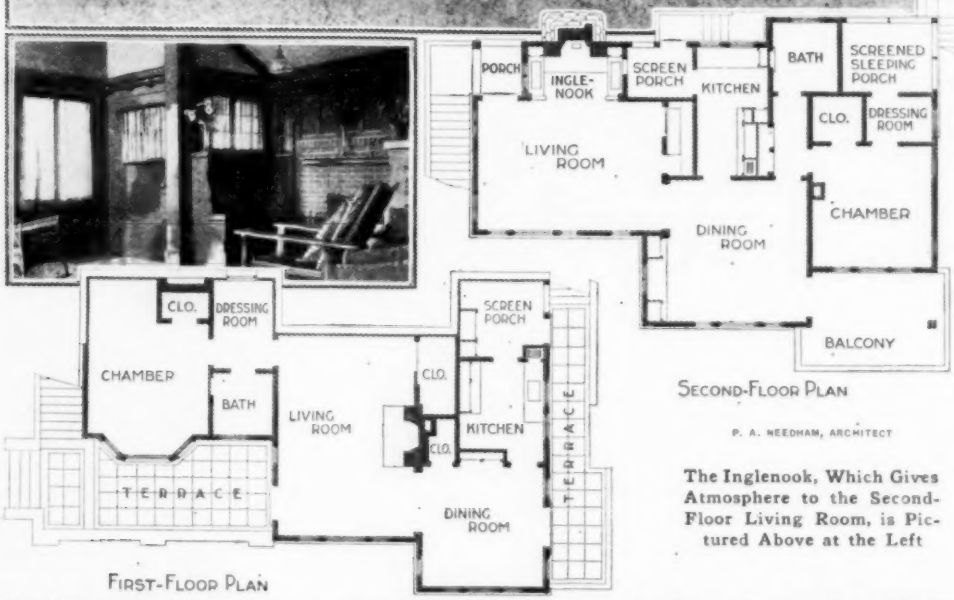
TWIN RESIDENCE IN SWISS-CHALET STYLE



The Inglenook, Which Gives Atmosphere to the Second-Floor Living Room, is Pictured Above at the Left

NOW that duplex houses are receiving the attention of an increasing number of builders, it is interesting to observe how admirably Swiss-chalet architecture responds to two-apartment designing. A splendid example of its application in this field is offered above. Outwardly presenting every appearance of a one-family residence, the structure affords unusually attractive accommodations for two families. Privacy equaling, if not exceeding, that of the city apartment building is provided, for the floors have no interior connection and are reached only by outside stairs. The convenience of the inside arrangement and the location and character of the porches and ground-level flagstone terraces are made apparent by the floor plans. Correspondingly, the outdoor architecture speaks for itself. The beam effect of the outer walls is obtained by employing heavy, wide weatherboarding and applying a soft-brown stain. It cost about $4,200 to erect the structure in the West.

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